Specialized Oil Publications of
THE GULF PUBLISHING COMPANY
Box 2608, Houston (1), Texas

The OIL WEEKLY and The COMPOSITE CATALOG
for the drilling-producing-pipe line industry

PETROLEUM REFINER and The REFINERY CATALOG
for the refining-natural gasoline industry

Member Audit Bureau of Circulation
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Published every Monday. Single copies 25 cents (except special issues). Subscription price: domestic and foreign, $2 a year; 2 years, $3; 3 years, $4. Advertising rates on application.
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The **OIL WEEKLY**

ENGINEERING NEWS STATISTICS

R. L. DUDLEY, President, Publisher A. L. BURNS, General Manager

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MARCH 24, 1947

VOLUME 125, No. 4

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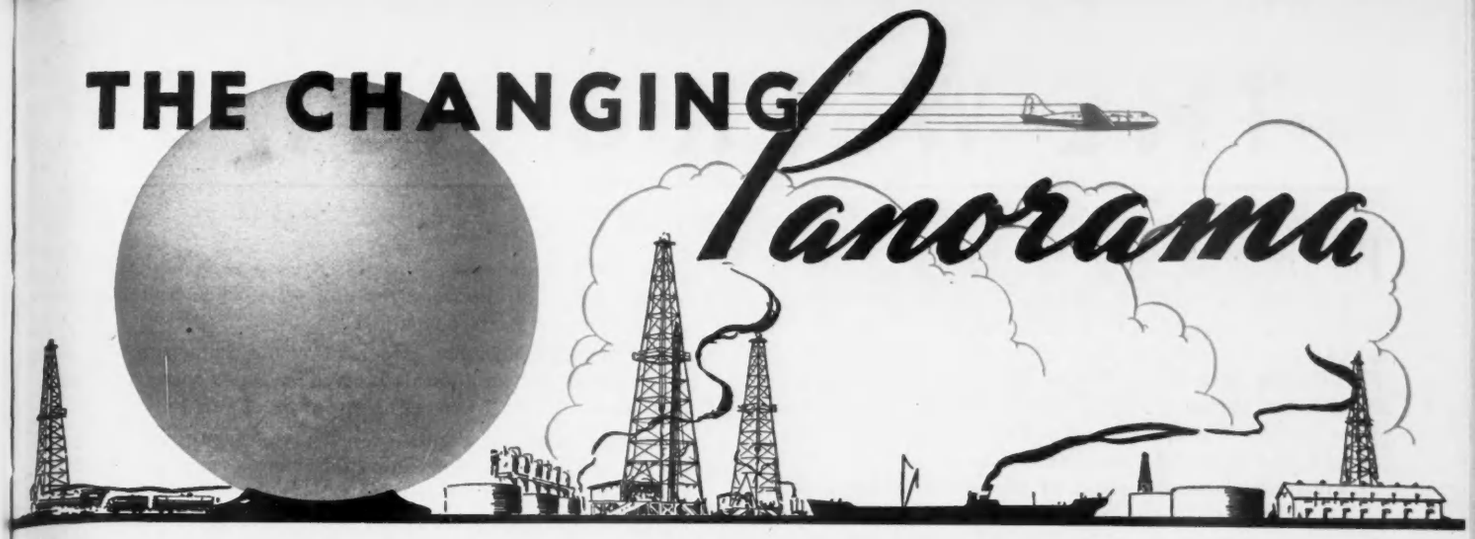


Tribute To AWHEM On Its Birthday

AS THE Association of Well Head Equipment Manufacturers rounds out its sixth year of constructive work, a word of commendation is due. Although planned and formed in 1941 by a group of qualified and interested manufacturers as a non-profit corporation, the association was not a "war baby." It was, and is, strictly a business organization made up of representatives of specialized firms with a specific job to do . . . the type of progressive job that has always characterized the oil industry.

Had the association done nothing more than promote harmony among its members—which it has uniquely done—its purpose would have been well served. But it has done far more. In wartime it was a major factor in expediting production and delivery when our machines of war so urgently needed oiling. Members swapped ideas, borrowed and traded engineering know-how; even labor and materials to keep surface hook-ups rolling to location. "No test of finished well head equipment is an accepted test," says the association, "unless a prescribed pressure (a figure having a wide safety margin) is reached, and maintained for an agreed period." Such a rule is only one of the improvements brought about by the association to assure better, safer equipment for the operator.

Highly complimentary to AWHEM is API's consideration to embody the association's findings in the Institute's recommended practices on testing procedures of well head equipment. Such a move would be sound thinking. After all, well head equipment is highly specialized. Changes, always toward improvement of this vital part of drilling and producing equipment, are continuously being made—perhaps too fast for rigid standardization except by this specific group whose membership comprises approximately 80 percent of the output of this specific class of equipment.

The oil industry is fortunate in having this highly specialized group at work as a unit on the important matter of standardization—is fortunate that the association has applied itself so seriously to this problem, because standardization in control equipment is a No. 1 *must*. And we think that the association is fortunate in having selected L. D. Hilton as executive secretary because he brought to the group more than 30 years of experience in designing, manufacturing, selling, installing and using well head equipment.

The Oil Pipe Situation

A Discussion And a Suggestion

THE most important thing facing the oil producing business today is the casing situation. Not so long ago it was the drill pipe and casing shortage but today the drill pipe shortage seems to have eased up but the casing situation appears to be getting worse steadily.

When an effort is made to find just what is the trouble, the individual investigator becomes even more confused. There seems to be no single cause for the present difficulty—probably several causes have contributed and are contributing to it.

Late in 1946 and early in 1947 THE OIL WEEKLY communicated with the mills manufacturing drill pipe and casing and asked what they thought their production would be in 1947 as compared with 1946, provided that there was no important labor disturbance. The mills told us that, barring labor difficulties, they should produce substantially more drill pipe and casing. With the exception of one, the important mills all said that their production in 1947 should be up from 20 to 45 percent. (One mill which has been allocating a small tonnage to casing said that its production would be even more.) On the whole, when answers were reviewed, it appeared that the oil industry should expect 20 to 25 percent more pipe this year than last—unless, of course, strikes interfered.

However, at this time oil men and supply men alike say that the demand exceeds the supply—and certainly drilling is not up enough to account for the difference. As a matter of fact, some of the most pessimistic think that the industry may not get enough casing to drill the wells planned at the first of the year, and some companies which have stepped their drilling plans up since that time, say that the situation will have to change or they will fall short a substantial percentage on the wells they deem necessary.

One major company told THE OIL WEEKLY that is has not yet been able to place 2000 tons of its requirements for the third quarter.

Some supply men think that the situation is a psychological one. Another says we have a badly maladjusted distribution.

Another says that he has heard that some independents have accumulated stocks over and above that needed at this time, while another says he has heard the same thing about the large oil companies!

Some few facts seem to stand out.

Last year two ruinous strikes, one steel and the other coal, cut down the production which the mills otherwise would have had. It is not unreasonable to assume that a part of our present troubles may be occasioned by the fact that the mills went into the new year far behind on their orders.

The annual statement of the National Supply Company just released says that

■ CONTINUED ON PAGE 13

THE WEEK'S NEWS

THE Interior Department has revised its leasing regulations to meet issues raised by the oil industry interpretation of maximum-acreage, over-riding royalties, assignments, etc. Page 14.

TET's Big Inch Plans—Texas Eastern Transmission Corporation has applied for a certificate for continued operation of the Big Inch pipe lines and plans to double their delivery capacity by November. Page 16.

Radioactive Tracer—Bureau of Mines experts see possibilities of developing a radioactive tracer, but project now is only in the discussion stage. Page 13.

Davies Heads Gas Company—A new company of which Ralph K. Davies is president is seeking permission for a Texas-to-Iowa natural gas line. Page 16.

California Price Troubles—Governor Warren blasts oil industry for gasoline price hike following increased prices posted for crude oil in that state. Story below and on page 56.

Syria Snarls Pipe Line—Syria is asking better terms from Trans-Arabian Pipe Line Company for new carrier of Saudi Arabian crude. Page 54.

More Texas Oil Asked—Higher allowables for April were asked by operators at the Texas statewide hearing. Commission cracks down on flared gas. Page 15.

The Pipe Situation—A suggested remedy is contained in the discussion of the very tight oil pipe (line and casing) situation which starts on page 11.

Pipe Line Expansions—Federal Power Commission has received more multi-million dollar applications; opens hearings next week on TGT expansion program. Page 16.

German Synthetic Plants—Allied plans to prohibit production of synthetic gasoline and rubber in Germany may have to be modified to make country self-sustaining. Story below.

Rubber Legislation—Extension of all rubber controls except government purchase is voted by the House of Representatives with the Senate expected to concur quickly.

End Use of Gas—Legislation providing for control of end-use of natural gas has been introduced "by request" in Congress by Representative Dolliver of Iowa. Page 14.

Justice's "Merger Unit"—The Department of Justice is ready to advise business men whether projected mergers will violate the antitrust statutes in effort to head off threatened new wave of monopolies. Page 14.

Deepest Well Troubles—Drill pipe is being cut off 300 feet from the bottom in the world's deepest well (17,236 feet) in Caddo County, Oklahoma. Page 15.

Venezuela 1946 Production

Official government figures place the 1946 output of crude oil in Venezuela at 388,491,414 barrels, of which 211,825,027 barrels was produced by Creole Petroleum Corporation, 76,969,779 barrels by Venezuelan Oil Concessions, Ltd., 57,819,731 barrels by Mene Grande Oil Company, 16,554,569 barrels by Caribbean Petroleum Company, 9,879,071 barrels by Compania Consolidade de Petroleo, and 7,948,163 barrels by Socony-Vacuum Oil Company.

Output by fields producing in excess of 10 million barrels was: Lagunillas, 115,892,376; Tia Juana, 63,244,579; Guara, 25,858,221; Cabimas, 25,847,942; Jusepin, 19,774,994; Quiriquire, 18,336,810; Bachaquero, 18,274,129; La Paz, 15,297,125; Santa Barbara, 14,575,100; Mene Grande, 13,115,385; Oficina, 13,080,363, and Mulata, 10,100,719.

Marshall Sounds Warning

Modification of the Allies' original plan for the demilitarization of German industry, including prohibition of the manufacture of synthetic gasoline and rubber, may be found necessary if Germany is to be put on a self-supporting basis, Secretary of State Marshall informed the Council of Foreign Ministers.

Mother Hubbard Extension

Another two-month extension of time in which to reply to the interrogatory filed by Sun Oil Company in the "Mother Hubbard" case was asked of the District of Columbia Federal Court last week by the Department of Justice.

The motion for the extension, the fourth to be asked, was filed three days after the deadline of March 17, due to delay in receiving the acquiescence of the company. The new date for filing the answer will be May 16.

Political Blast Follows California Action in Raising Crude and Gasoline

The California oil situation was viewed from varied angles last week following the posting of increased prices for crude oil and products. (See page 56.)

Governor Earl Warren, whose program to increase the California gasoline tax is being strongly opposed by the oil companies, denounced the .8-cent per gallon increase in gasoline prices and said he will ask the anti-trust division of the Department of Justice to investigate.

Meanwhile, during the first 10 days of March, California's daily average production rose to 913,850 barrels, according to Oil Producers Agency. Excluding wartime production from the Elk Hills Naval Reserve, current output is the highest in the history of the industry. California production of oil in February of 900,500 barrels daily exceeded the average for 1946 by 37,000 barrels. February output was 53,000 barrels in excess of MER, according to William R. Wardner, Jr., manager of the conservation committee, who warned that "California is producing too much crude oil, both from the standpoint of good conservation practice and of satisfying the normal market demand. "Wardner pointed that if the state's output continues at present levels the rest of the year and if total demand for oil continues at last year's level, a surplus of 27 million barrels would be added to storage.

With production at a peak, W. C. Whaley of Barnsdall Oil Company and president of the Oil Producers Agency, declared that California reserves are falling off and that the discovery of "new pool" reserves was at the rate of only one barrel for every 22.8 barrels produced and consumed.

A spokesman for the Standard Oil Company of California, which initiated the price increases, commenting on Governor Warren's remarks said the higher gasoline prices were necessitated by higher crude prices.

Governor Warren's blast was answered by the Oil Producers Agency which insisted he had "confused a political issue with an economic situation."

It was the independent producers' insistence and not the work of "slick lobbyists" that was responsible for the recent price increases, the governor was told.

Preceding the crude price boost, dissatisfaction with prices had been expressed by the Oil Producers Agency which declared that "at a recent meeting of the board, criticism grew so heated that some members even considered the advisability that independent producers shut in their wells until California purchasing companies at least meet the recent increase in oil prices in the Mid-Continent."

All major purchasing companies and principal marketing companies have met the advanced prices.

Gasoline Price Probe

An investigation of the situation was initiated before last year's elections at the request of then Congressman Henry C. Dworshak, of Idaho, a successful candidate for the Senate, but no action has ever developed. A department official said that since the latest increase in gasoline prices a flood of complaints has been received, and a study is being made.

The Oil Pipe Situation—A Suggestion

■ CONTINUED FROM PAGE 11

because of gas shortage it has already lost one month's production, this in its Aetna plant, and the operation of its Ambridge plant has been affected to a lesser degree. We have heard, without confirmation, that a strike of 28 railroad employes on one mill's plant railroad cut off four days' production there. The gas shortage is reported to have affected still other mills.

Demand for line pipe is at an unprecedented level. The possibility has been mentioned that some of the steel planned for casing may have gone into line pipe. That has not been confirmed.

On the other hand, concerns trying to get line pipe say that they are informed that the mills prefer to roll casing because they make more money on it than on line pipe. (It would appear that some of the confusion might be eliminated by the public relations departments of the mills starting an educational campaign along this line, and that!)

We have heard that the export trade has been taking a big percentage of American-made casing. However, it would appear that only about 10 percent of the domestic production of casing is going to export. Shell interests abroad, we are told, had planned to make heavy purchases of Czechoslovakian pipe, only to be advised, after they had put dependence on these mills, that the pipe could not be supplied. This report, not confirmed by Shell, also says that now Shell, abroad, is frantically looking to make up the lost supply.

In view of the fact that on the whole it appears probable that actual mill tonnage is up thus far this year and that the increase in domestic drilling during the first two months of the year is up only 2.537 percent, it does seem that possibly there is something to the arguments on maladjustment of distribution as well as the psychological angle.

During the war it was found advisable to set up pools from which pipe was allocated. This was done under the supervision of PAW. The suggestion has been made that an emergency pool be formed, composed of tonnage to be taken from pipe being delivered currently, and that pipe from this pool (stocks to be located at one or more points) be allocated in the case of genuine emergencies. It was figured that the tonnage taken from current deliveries would not have to be large. The man who suggested this also thought that part of the maladjustment lies in one company's having ample supplies of certain sizes while running short on another, with a reversed situation applying to the stocks of still another company.

Two mill representatives said that in their opinion, if the buyers felt that their supply during the remainder of the year could be assured (possibility of strikes is considered here) they believe that the companies would cancel some of their long range orders placed for protection, and in many instances would be willing to lend pipe from their stocks.

Meantime governmental agencies, sensing the seriousness of the situation, are making a study of it. It would be too bad if these governmental agencies find that in time of peace the oil companies and the pipe mills cannot do by voluntary action what was done under government sponsorship and direction during the war.

THE OIL WEEKLY's suggestion is that buyers and sellers get together in an effort to correct any maladjustment that may exist on distribution, that the get-together be a public one, and that the overall picture and its effects be discussed. Otherwise there may be results which neither would want to see.

Export Control Extension Argued in Pipe Shortage

A one-year extension of the export control authority asked of Congress by President Truman was said last week by officials concerned with the steel pipe situation to be "absolutely essential" if the domestic production of pipe is not to be dissipated abroad.

Line pipe is under stiff control and the only exports which have been permitted have been for maintenance, repair and operation. Three applications for export of large quantities of pipe have been filed with the Office of International Trade for lines proposed in Saudi Arabia, Venezuela and Mexico and a fourth is expected momentarily for a line in Bolivia. OIT officials at the end of the week were discussing whether these applications could be granted at this time.

In his message to Congress, President Truman said: "If we retain the ability to channel commercial exports of critically scarce materials, including steel, we can permit export of these products to countries whose need is greatest while still protecting the United States from excessive export drains."

Meanwhile, a subcommittee set up by the OGD interdepartmental advisory committee is making a study of the pipe situation. The committee will report just what the situation is and the prospects for improvement, but will make no recommendations.

Wesley E. Disney, general counsel for the Independent Natural Gas Association of America, said last week that gas companies ordering pipe now have little assurance of delivery before 1949 or 1950. Applications for new lines recently filed with the FPC in most instances state that construction will be started only when material becomes available.

ASTE Annual Meeting Looks at Industry Needs

The annual meeting of the American Society of Tool Engineers, held in Houston last week, paid special attention to the ever increasing need of the oil industry for precision tools. A. A. Nichoson, The Texas Company, speaking on "The Tool Engineer Looks at Oil," outlined industry requirements for tool engineers and stressed gains which could accrue through improved tools and resultant better operating methods.

The manufacture and use of geophysical instruments, precision tools of a very high order, were described and oil industry applications outlined by J. H. Dunaway, Aledbert Barry, S. E. Swain, and D. W. Blair, of Humble Oil & Refining Company. Another paper, of interest to the oil industry through requirements of such threaded members as drill and line pipe, was that by E. V. Flanders, Jones & Lamson Machine Company, whose topic was "Crush and Diamond Dressing As Applied to Thread Grinding."

An evening seminar on "Valves and Meter Manufacture" closed the technical portion of the meeting.

Secondary Recovery and OGD

A thorough study of methods of extending secondary recovery operations tops the list of cooperative activities discussed by OGD Director Max W. Ball at his recent meeting with officials of the Interstate Oil Compact Commission.

The idea is to make a thorough study of the question from the engineering angle, under the auspices of the commission with the OGD acting in an advisory and consulting capacity.

Radioactive Tracer Discussed

Possibilities of developing a redioactive tracer for use in secondary recovery have been discussed by Bureau of Mines experts among themselves, but nothing definite has been undertaken and it is not likely that the matter will be taken up until after considerably more "thinking" has been done about it.

It is believed that the injection of some radioactive material into an oil pool might permit "seeing" how the water moves underground in a waterflood operation. A similar idea, it is pointed out, is used in the introduction of such a material to trace the blood stream through the human body.

Bureau officials were emphatic in saying that not only has a radioactive tracing system been developed but that it has not even been undertaken, and the idea is only one of a number which are discussed from time to time within the bureau.

Use of helium as a tracer, officials said, is working out well. The major drawback is not the cost of the helium itself but the cost of shipping it, which makes it an expensive proposition in fields where the gas content of wells contains an appreciable amount of helium and it is necessary to use a considerable quantity of the gas to make a showing.

Amendments in Rules for Public Land Leasing Are Announced by Department

The Interior Department has revised its regulations covering leases on the public lands, to meet objections raised by the industry to its original proposals under the amendments written into the Federal Mineral Leasing Act in 1946.

While the law limits the amount of acreage to be held by an individual or association to not exceeding 15,360 acres, individual members of an association will be chargeable only with their proportionate share of the total acreage held by the group.

Limitation of 100,000 acres in any one state on exploratory options will apply to options on applications for leases as well as on areas subject to leases actually issued, but acreage held under options taken prior to June 1, 1946, will not be chargeable to the 100,000-acre limitation.

The department refused to amend a requirement that a holder of exploratory leasing privileges must elect on or before December 31, 1948, whether to continue operations under the provisions of the original leasing law of 1920 or the more liberal provisions of the 1946 amendment.

It also refused to make any changes in regulations authorizing the Secretary to limit the amount of over-riding royalties which may be created, but an amendment provides that over-riding royalties in the same manner as payments out of production can be created without limitations for such periods as the daily average production is more than 15 barrels for the lease or any portion segregated for royalty purposes.

Application for approval of an assignment show that over-riding royalties or payments out of production have not been created contrary to the regulations.

Over-riding royalties of one percent or less will be approved only upon specific request, but such royalties, whether or not approved, will be recognized as valid if filed for record.

An assignment may be disapproved only for lack of qualification of the assignee or insufficiency of his bond, except an assignment of a separate zone or deposit or part of a legal subdivision will not be approved unless the necessity therefor is established.

If a lessee is in default under the lease when an assignment is filed and such defaults are not cured before the assignment is reached for action, the lease will be held for cancelation, except that where such defaults have been remedied as to the portion of the lease assigned, the assignment will first be approved before action to cancel the remainder of the lease is taken.

Another amendment provides for the issuance of two or more leases, for lands in a single application, where they cannot be included within a six-mile square.

Submerged Land Leasing Continued by Louisiana

The Mineral Board of Louisiana has leased 489,810 acres of submerged land in the Gulf of Mexico, receiving cash bonuses totaling about $2½ million. Buyers were as follows:

South Pelto area: Humble Oil & Refining Company, 11,100 acres; Stanolind Oil & Gas Company, 5000 acres and Pan American Production Company 5000 acres.

Grand Isle area: The California Company, 7500 acres, and Continental Oil Company, 92,500 acres.

West Delta area: The California Company, 17.047 acres, and Continental, 103,026 acres.

South Pass area: Shell Oil Company, Inc., 95,430 acres and The Texas Company, 9863 acres.

Timbalier area: Humble, 76,360 acres; The Texas Company, 5214 acres; The California Company, 2500 acres; Stanolind, 8772 acres; Continental, 14,296 acres; and Pan American, 28,416 acres.

B. A. Hardey, chairman of the board, said that the tideland title dispute has not yet been settled, but he believed that, regardless of the outcome of the pending suit, prior contracts will be recognized. It was his opinion that the congressional joint resolution, which will give the states title to the tidelands, will be passed so strongly that it will discourage another presidential veto.

J. V. Brown to NPC

James V. Brown, for the past several years connected with the Independent Petroleum Association of America as a statistician and analyst, has been appointed secretary-treasurer of the National Petroleum Council. During the war period, Brown was secretary of the PIWC production committee and subcommittee on petroleum economics and also has served as vice chairman of the economics advisory committee of the Interstate Oil Compact Commission. He will take over his new post April 1.

Control of End Use of Gas Is Given FPC in New Bill

Legislation which in effect would direct the FPC to control the end-use of natural gas was introduced "by request" in Congress last week by Representative James I. Dolliver of Fort Dodge, Iowa. The request is understood to have come from railroad interests.

During FPC's hearings on natural gas, nine witnesses from Iowa testified, all expressing strong opposition to any control over end-use.

The bill seeks to promote the "conservation" of natural gas, and Dolliver explained that it in no way broadens the authority of the FPC but merely prescribes standards to eliminate "wasteful" uses and clarifies FPC policy by giving consideration to areas already having natural gas service.

New Merger Unit Called Advisory, Not Punitive

Seeking to avert a threatened new flood of monopolies and combinations in restraint of trade, Attorney General Tom C. Clark has set up a merger unit in the Department of Justice which will examine all proposed mergers and advise the participants whether they would be considered in violation of the anti-trust laws.

Clark's action followed issuance of a report by the Federal Trade Commission that 1800 mergers have occurred since 1940 and there is a dangerous trend toward concentration of industry.

The Attorney General indicated that the activities of the new unit would be more advisory than punitive, and that its creation meets a desire of the business community generally for a disclosure by the department of its views on projected activities.

Although creation of the new unit has just been announced, it is known to have been active for some 60 days, and has already passed upon a number of proposed mergers and acquisitions, several of them involving oil companies. It is understood that no objections were found to any of the plans of the oil industry.

Army-Navy Procurement

Legislation providing for joint procurement of all supplies common to both the Army and Navy has been passed by the House and now goes to the Senate for concurrence.

Discussion of the measure in the House developed that in recent weeks the two services have been studying the procurement of petroleum and coal and are expected to place both these items, at least in major part, under single service purchasing, probably continuing the system developed by the joint Army-Navy Petroleum Board.

Suman Named

Appointment of John R. Suman, vice president of Standard Oil Company (New Jersey), as chairman of the American Petroleum Institute's central committee on standardization of oil field equipment to succeed the late J. Edgar Pew, has been announced by API President William R. Boyd, Jr.

Suman long was one of Pew's chief aides, Boyd said, and the central committee is particularly forunate in that he has served on a number of committees concerned with its work.

AAPG Meeting Today

California geologists, paleontologists and geophysicists, for the first time since 1937, will be hosts at the annual concurrently-held meetings of the American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and the Society of Exploration Geophysicists to be held at the Los Angeles Biltmore Hotel March 24 through 27. Early indications are that some 1800 delegates will attend.

Higher Texas Allowables Are Urged for Next Month

Higher allowables for April were advocated by operators before a Texas Railroad Commission statewide proration hearing held last week in Fort Worth. March allowables had been increased 100,000 barrels per day, but some refiners were still short of crude and major purchasers urged that there be no cut.

Nominations filed by the purchasers totalled 2,469,883 barrels per day for April, 32,464 barrels higher than March nominations. The Bureau of Mines estimate for April was up 60,000 barrels to 2,120,000 barrels per day. Meanwhile the commission reported that production for the week ending March 15, totalled 2,129,000 barrels daily.

Two commissioners were absent because of illness, but Chairman Thompson read into the record a statement of the stock situation which indicated that both crude and product stocks were declining despite the high production.

Max Ball, director of the Oil and Gas Division of the Department of the Interior, attended the hearing, told of OGD aims and objects and promised closer cooperation with the Interstate Oil Compact Commission.

The commission reported a decline of 0.73 pounds in the East Texas bottom hole pressure during February, but H. P. Nichols, of the East Texas Oil Association, asked that the field produce an additional day in April despite this drop.

Joe Zeppa, president of the East Texas Salt Water Disposal Company, asked the commission to require injection of 75, instead of the current 60, barrels of water for each barrel of bonus oil produced.

Because a new line is open to El Paso (Standard of Texas), and the Stanolind line to Cushing has an increased capacity because of added equipment, some 11,000 barrels more West Texas oil can be transported from the area next month, it was disclosed.

Texas Cracks Down On Seeligson Flared Gas

Effective April 1, no oil or gas well in the Seeligson field, Jim Wells and Kleberg counties, may be produced unless all gas produced incident to its operation is diverted to a legal use. This order, issued by the Texas Railroad Commission last week, is designed to stop the flaring of more than 30 million cubic feet of gas daily which contains approximately 1275 barrels of recoverable liquefiable hydrocarbons.

Commission Chairman Ernest O. Thompson said "this is the first time in the history of proration in Texas that we have ever had to resort to this means to stop gas waste. We are going after every field where gas is being flared excessively and hope to put an end to needless gas waste in Texas."

Commission officials have indicated that a similar order is likely to be put into effect in the Heyser, Fairbanks, Tom O'Connor, Slaughter, and some six or seven other fields.

Magnolia Petroleum Company has asked the commission to delay the effective date of the Seeligson order. R. D. Hanley, head of Magnolia's gas-gasoline department, said that every effort is being made to handle the casinghead gas, but indicated that it would be November or December before installations would be complete and in operation.

Compact Group to Study Oil "Incentive" Payment

Chairman Hiram M. Dow last week announced appointment of an Interstate Oil Compact Commission committee to study the problem of obtaining maximum oil recovery from the nation's stripper well reserves and the necessity or advisability of governmental "incentive" payment as follows: Don T. Andrus, Bradford, Penn., chairman; William J. Murray, Jr., member Texas Railroad Commission, vice chairman; J. E. Berry, Smackover, Ark.; Ivan G. Burrell, Ohio Oil Company, Bridgeport, Ill.; and Charles B. Peters, Jr., Tulsa.

The committee was authorized at the compact's Dallas meeting and is to work with other agencies and organizations that are conducting similar investigations.

Crude Oil Production in the United States

(Estimates compiled by THE OIL WEEKLY. All figures indicate daily averages in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED March 22	March 15
Alabama	950	900
Arkansas	74,000	74,500
California	909,400	914,700
Colorado	34,000	35,000
Florida	740	590
Illinois	187,100	190,500
Indiana	17,000	17,600
Kansas	267,750	260,700
Kentucky	26,750	26,500
Louisiana	406,250	405,450
North Louisiana	94,800	94,000
South Louisiana	311,450	311,450
Michigan	42,500	43,500
Mississippi	88,850	83,850
Missouri	100	100
Montana	22,600	22,000
Nebraska	650	650
New Mexico	104,400	104,400
New York	13,200	11,800
Ohio	8,500	8,000
Oklahoma	367,850	367,450
Pennsylvania	34,800	31,200
Tennessee	25	25
Texas	2,129,750	2,129,750
Tex. R. R. Comm. Districts:		
Dist. 1—South Central	20,550	20,550
Dist. 2—Middle Gulf Coast	157,900	157,900
Dist. 3—Upper Gulf Coast	487,300	487,300
Dist. 4—Lower Gulf-S.W.	242,000	242,000
Dist. 5—East Central	38,300	38,300
Dist. 6—East Texas field	313,000	313,000
Dist. 6—Rest of Northeast	111,000	111,000
Dist. 7-B—North Central	36,425	36,425
Dist. 7-C—West Central	34,900	34,900
Dist. 8—West	473,725	473,725
Dist. 9—North	130,000	130,000
Dist. 10—Panhandle	84,650	84,650
West Virginia	7,500	6,750
Wyoming	109,000	107,000
Total United States	4,853,665	4,842,915

Total stocks, foreign and domestic, March 15 as reported by the Bureau of Mines were 222,341,000.

Drill Pipe Being Cut Off In World's Deepest Test

All efforts to free stuck drill pipe in the world's deepest well have failed, and crews are now cutting pipe 300 feet off bottom.

The well is Superior Oil Company of California's Weller 51-11, NW NW NE 11-8n-12w, 5 miles north of Fort Cobb, Caddo County, Oklahoma.

Drill pipe stuck on March 15 when the crew started out of the hole. Pipe stuck 25 feet off bottom. Total depth of the wildcat is 17,236 feet.

Edwin L. Smith of Superior's Oklahoma City office reported March 21 that repeated attempts to free the pipe—which apparently became stuck by an accumulation of heavy mud, or shale cavings, had met with no success and that John Cody, general superintendent of the company with headquarters in Los Angeles, and C. L. Corley, drilling superintendent at the Weller, had decided to cut pipe at about 16,936 feet, 300 feet off bottom. About seven drill collars will have to be fished out following cutting of the pipe and if this proves unsuccessful, crews may be forced to set whipstock and by-pass the pipe.

Flared Gas Reduced

Flared gas in Louisiana, the Conservation Department reported last week, has been reduced by more than 50 percent since 1941 when it reached a total of more than 550,000,000 cubic feet daily. Reduction to the current 217,000,000 cubic feet daily has been accomplished even though production of oil has increased from 265,000 barrels daily in 1941 to more than 445,000 barrels now.

Department officials attributed the reduction to the cooperation of producers in the use of cycling plants, finding new markets for the gas previously flared, and to the use of the department's ratio-allowable penalty.

Sayers Leaving Bureau

Dr. R. R. Sayers, director of the Bureau of Mines, will leave the Interior Department at the end of the month to return to the Public Health Service, from which he was "borrowed" by President Roosevelt in 1940. This was his second detail to the bureau, he having served as chief of the health and safety branch from 1917 to 1933.

James Boyd, Dean of the Colorado School of Mines, has been nominated by President Truman to succeed Sayers.

Correction, Please

In the article, "Efficient Continuous Flow Gas Lift," by Roy A. Bobo, there appeared stenographic errors which vitiate the equations in which they are shown. In equation 3, page 36, THE OIL WEEKLY for March 17, the expression $\frac{n-1}{n}$ should have appeared as the exponent of the Factor R, instead of as a multiplier thereof. In equations 5 and 6, on the same page, the figures 0.2064 should appear as an exponent of R, instead of as multiplier.

Ralph Davies President Of Gas Pipe Line Company

Ralph K. Davies, wartime deputy PAW administrator and acting director of the OGD until Max W. Ball's appointment, is now president of Trunk Line Gas Supply Company, which has been organized to build an 885-mile 30-inch pipe line from Texas to Iowa with a capacity of 425,000 Mcf daily.

In an application filed with the FPC, the company disclosed that the proposed line, costing an estimated $74,266,507, will originate in Wharton County, Texas, getting its gas from among the 160 gas fields along the Texas Gulf Coast in Railroad Commission Districts 2, 3 and 4, and will run to Keokuk County, Iowa.

The new line would cross lines of a number of these companies which are in need of gas supplies, which it hopes to serve Four of these companies, it was said, would require 2500 miles of new pipe line construction to fill their needs, which could be met in this way. They are Natural Gas Pipe Line Company of America, Northern Natural Gas Company, Michigan-Wisconsin Pipe Line Company and Panhandle Eastern Pipe Line Company. Other lines crossed would include those of Cities Service, Arkansas-Louisiana, Arkansas-Western, Arkansas-Oklahoma and Mississippi River Fuel Companies.

TGT Expansion Program Before FPC On March 31

FPC will open hearings March 31 on an application of the Tennessee Gas and Transmission Company for construction of some 552 miles of 26-inch, 69 miles of 24-inch and 82 miles of 20-inch loop line along its main line, with an aerial suspension crossing over the Mississippi River, and 83 miles of 20-inch line from a compressor station in Natchitoches Parish, La., to the Carthage Gas Field in Panola County, Texas, together with other necessary lateral lines, a new 6000-horsepower compressor station in Neuces County, Texas, and installation of an additional 75,400-horsepower compressor units in other stations. The program, costing $53 million, is designed to increase delivery capacity to 600,000 Mcf daily.

Panhandle Eastern Seeking Further Expansion of Lines

Panhandle Eastern Pipe Line Company has asked for authority to construct additional facilities in Texas, Kansas, Missouri, Illinois, Indiana and Michigan, designated as the Group C facilities, to be added to the Group A and B facilities already authorized.

These facilities, to cost $23,464,000, include construction of about 356 miles of 26-inch pipe as a third loop line and installation of an aggregate of 37,600 horsepower in existing compressor stations. Upon completion of the A and B group facilities the company will have a capacity of 473,000 Mcf daily, and the additional C facilities will raise it to 580,000 Mcf.

Sinclair Announces Long Products Line

Sinclair Oil Corporation and Sinclair Refining Company are planning a products line that will eventually exceed 3000 miles in length and will connect the companies' Gulf Coast, Great Lakes and Atlantic refining areas, Harry F. Sinclair president, announced in Houston last week.

The project will start at the Houston refinery with a 10-inch line to Fort Worth, Tulsa, Coffeyville and Kansas City. At Kansas City a new 8-inch line will be built to St. Louis and on eastward to Columbus, Ohio, where it will connect with a recently completed products line. Sinclair also will build an 8-inch products line from the Corpus Christi refinery to San Antonio and Austin.

Sinclair has a products line running from Marcus Hook, Penn., to Steubenville, Ohio. Another line operates between the East Chicago refinery and Toledo-Columbus. Midway on the Toledo-Columbus link a new line is under construction that will connect with the present Atlantic Coast terminal at Steubenville.

Communities to be served by the new 8-inch products line east of Kansas City include Indianapolis, Terre Haute and Dayton.

A large part of the pipe necessary to build the Corpus Christi-Austin project already has been obtained and right-of-way for most of the system has been purchased.

Adams County Oil Line

Interstate Oil Pipe Line Company is taking bids for the construction of 18 miles of crude oil pipe line in Adams County, Mississippi.

The proposal includes ten miles of 6-inch from the company's mainline pump station at Cranfield to the La Grange field, and 8 miles of 4-inch from La Grange to the Carthage Point field.

Construction is expected to start soon.

Gas Extraction Plant

Plans of Sun Oil Company and C. H. Murphy, Jr., to construct a $2½ million liquid hydrocarbon extraction plant in the Delhi field, North Louisiana, to process some 14½ million cubic feet of gas daily have been announced by Joseph L. McHugh, commissioner of the Louisiana department of conservation.

Gas Project Withdrawn

Because of inability to perfect firm commitments of gas, Mid-Continent Gas Transmission Company has asked withdrawal of its application for construction of a pipe line system from Liberal, Kan., to Kansas City, Mo., and St. Paul, Minn. The application covered a double 400-mile 26-inch line from the Hugoton field to Kansas City and a single 436-mile line to St. Paul, with three compressor stations, to cost $72,600,000.

The company said it will file a new application later.

New 93-Mile Line Proposed From Baxterville Gas Area

Construction of 93 miles of 18-inch natural gas pipe line from the Baxterville gas field in Marion County, Mississippi, to junctions with other lines near Mobile, Ala., and substitution of 16-inch pipe for the present 12-inch line running 8.3 miles from Whistler Junction, Ala., is proposed by United Gas Pipe Line Company in an application filed with the FPC. Cost is estimated at $3,150,000.

TET Seeks to Double Capacity of Big Inch

Doubling of the present capacity of the Big Inch pipe lines to transport gas to the Appalachian area is proposed by Texas Eastern Transmission Corporation in an application filed with FPC for a temporary certificate for operation.

If permitted to construct three compressor stations which it would install by November 1, the company said it will increase the delivery capacity of the lines, now about 125,000 Mcf daily to 250,000 Mcf.

TET declared it is prepared to go forward promptly with plans for utilizing that portion of the lines carrying gas to the shortage area, and of expanding its capacity for next winter's needs.

Under its lease from the WAA, the company is permitted to construct not more than three compressor stations with a maximum of 18,000 horsepower, to cost not in excess of $3 million. If the stations are built, an escrow fund is to be set up in which TET will deposit all rentals, except those necessary for payment of taxes, until a total of $2,500,000 has been deposited; if the sale to TET is consummated, the fund will go to the Government but, if the sale does not go through and the lease expires or terminates, the company will receive a sum, not to exceed $2,500,000, out of the escrow fund equal to five-sevenths of the cost of the stations, which thereupon will become the property of the Government.

Oil Use Permitted

Under the lease, TET will pay a rental equal to 6 cents per Mcf of gas transported through the lines, which are to deliver jointly not less than 3,000,000 Mcf per month as far east as the state of Ohio.

The company will be permitted to use or sublease those portions of the lines not used for the transportation of natural gas, for the storage or transportation of petroleum, and will pay additional rental for such facilities.

The lease is made subject to the rights and interests created by WAA to others, but the properties so excepted will come under the company's control upon the expiration or present leases or other arrangements.

These exceptions include 11,766 feet of six-inch feeder line between the Eastern States Petroleum Company refinery and the Sinclair Refining Company refinery in the Houston area, leased to Warren Petroleum Company for a six-month period expiring March 24; fifteen 8000-barrel tanks at Phoenixville, Pa., leased to The Atlantic Refining Company for one year expiring June 11; 14,402 feet of 12-inch pipeline at Linden, N. J., leased to Cities Service Oil Company for one year ending May 31; ten tanks at Linden reserved on letter of intent to Standard Oil Company (New Jersey) for a term to expire upon 40 days' notice.

Other Reservations

Also reserved are 20 tanks at Beaumont, Tex., and 20,236 feet of 10 inch line from them to the tank farm of Magnolia Petroleum Company, together with necessary pumping equipment, and five tanks and 1400 feet of 4- and 6-inch line at Marietta, Pa., used by the War and Navy Departments under agreements with the RFC which will expire upon 60 days' notice to vacate; an 8-inch line between the scraper traps of Cities Service Oil Company and Continental Oil Company at Lake Charles, La., leased on May 1 to Continental for a term not specified; subleases from Tennessee Gas and Transmission Company to Moore Oil Terminals and The Atlantic Refining Company which terminate April 30, and a power line easement in Bienville Parish, La., from the RFC to Louisiana Power and Light Company.

Middle East Oil

By RAY L. DUDLEY
Publisher

TOO often, in speaking of the great reserves found in this or that foreign country, mention is made only of the oil found and the matter of cost is shrugged off with the thought "Oh, well, look how much oil is there."

A case in point is Saudi Arabia and, for that matter, the entire Middle East. A few years ago Saudi Arabia did not show up in a table of the world's reserves. Today it is among the big ones, with possibly 5750 million barrels proven by the drill and with informed authorities confident that it will run far greater.

But how about the initial cost of getting ready to get it out?

Construction will start shortly on a pipe line which will cost in excess of $120 million—maybe considerably in excess of that amount. Additional tankers will be needed to convey this oil from the Mediterranean terminal of the new pipe line—probably in excess of $100 million worth.

Current investments including refining, already are in excess of $150 million and another $100 million will have to be spent on additional refining capacity and field work. This will bring the total up to more than $470 million, and our guess, confirmed by company officials, is that it will run far above that amount.

Sharing Risks Too

These are sizeable figures. They amount to more than the national budget of some pretty fair sized nations. And the money will come from American investors, most of whom are already heavily invested in oil. There is no wonder that The Texas Company and Standard Oil Company of California were willing to allow Standard Oil Company (New Jersey) and Socony-Vacuum Oil Company to share in the profits of the enterprise as long as they share in the risks.

Where will the oil go to market to amortize the investment and pay a return on it? The primary market will be Europe, it would appear. The United States ultimately may provide a part of the market, too.

Standard Oil (New Jersey) says that it will need all of the oil acquired recently to take care of its Eastern Hemisphere needs, but such contemplation, we guess, probably covers only the next five years. The Texas Company will use the fuel oil from its Saudi Arabian crude, and some of the other refined products, to take care of its European market, but contemplates brining in tops to the U. S.

The coal situation in Europe is such as to indicate a big demand for fuel oil within the next few years—how long we cannot guess. In fact the coal situation deserves a special article itself.

Will South America feel the effect of the new oil when crude from Iraq, Iran, Saudi Arabia, and Kuwait starts flowing in increased quantities through the new pipe lines?

Just Isn't Enough Oil

It will require two years to complete the new lines, and there appears no likelihood of a decrease in movement of South American oil to Europe during that time. Nor does there appear to be any likelihood of South American oil flooding the U. S. market. There just isn't enough, oil company officials say.

It would seem likely that in the event it becomes necessary to supplement domestic production with greater imports of oil, South America will be called upon to supply most of it, although, as already indicated, some oil will come in from the Middle East.

Thus, one appears to be safe in concluding that, unless South American nations by their own acts interfere, South American production will continue its upward trend for some time, and, in the words of one oil company official, remain at a level of not less than 1.4 million barrels per day for Venezuela alone, as long as the country can produce that amount.

American producers have been fearful of heavy imports of Mid-Eastern oil. There has been considerable speculation as to the cost of laying down crude oil from Saudi Arabia to the U. S. Consequently we recently made inquiry of officers of Arabian American Oil Company to find out how they viewed the situation.

Costs and Politics

Here are the conclusions we drew, and the information from which we drew them:

At this time it does not seem likely to us that Saudi Arabian oil, even if available in large quantities, will be offered for delivery at Atlantic Seaboard at prices which would be ruinous to domestic producers.

Nor would it appear to be a sensible thing for four of the largest producers in the United States to desire to pull down around their ears their own domestic price structure.

Basing our calculations on the price at which Saudi Arabian oil is now being delivered at its Persian Gulf docks (the price obtaining before recent upward adjustments of domestic crude prices), it would appear that Saudi Arabian oil cannot be laid down in the U. S. for less than $2.10½ barrel when the Trans-Arabian pipe line is completed.

It is selling at a Persian Gulf terminal now at $1.25 per barrel. Add 25 cents for pipe line costs including amortization, 50 cents for tanker costs to New York from the Eastern Mediterranean, add 10½ cents for U. S. tariff and you have $2.10½. But the pipe line costs may be greater than has been indicated, production costs ultimately can and likely will increase some, which means that the cost at the Eastern Mediterranean loading point may run higher than figured above.

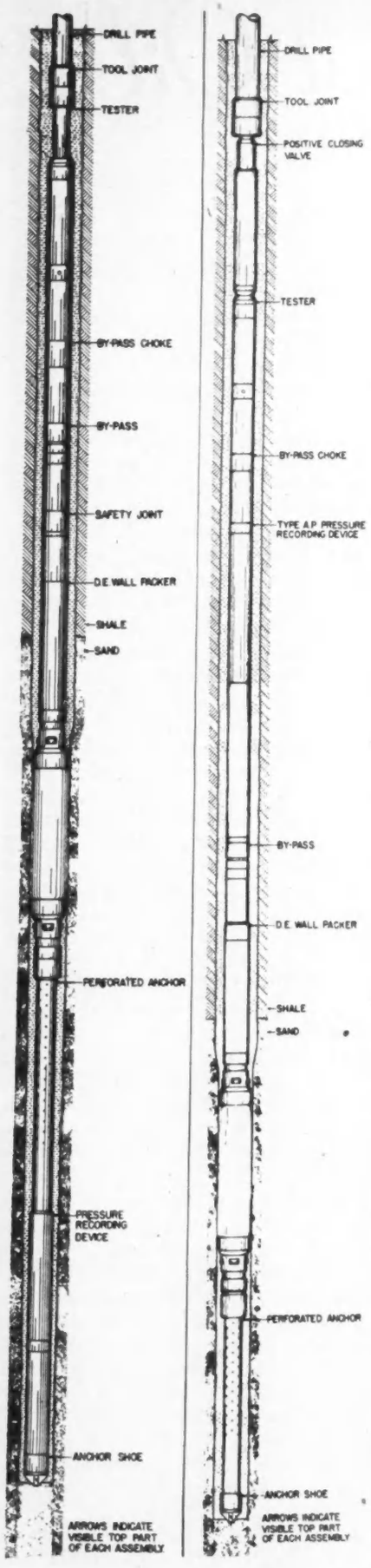
Political Questions Important

The risks usually attending heavy expenditures in the U. S. are economic, and the question of oil in place becomes a most important one. In the case of the Middle East apparently there is no question of the oil being there but the political question can be a most important one.

Stockholders of The Texas Company, Standard Oil Company of California, Standard Oil Company (New Jersey) and Socony-Vacuum Oil Company, we think, will be willing to take the risks, and other investors who will likely be offered the opportunity to purchase bonds in the financing of the project, will be attracted. But they are not going to be attracted on the basis of a public utility return. No, they will expect a profit commensurate with the international political risk. They should have it. And they likely will get it. That doesn't sound like a flood of cheap oil! It sounds more like a reasonable, long-term, peacetime back-log to the American supply for that time in the future when and if we need it.

Formation And Testing

By JOHN C. PADGETT



Left: Wall packer test. Right: Wall packer test (with type A.P. pressure recording device and positive closing valve).

PRIOR to the introduction of drill-stem formation testing, the method used for testing the productivity of a well was to set casing above the formation to be tested and then bail the well to remove the drilling fluids, thus permitting the oil, gas, or water to flow out of the formation into the casing.

This method was not only expensive and slow, but each time a string of casing was set to make a test, the diameter of the hole had to be reduced accordingly. After several of these tests, the hole was reduced to such a small diameter that deeper drilling was impractical.

In many producing fields and in isolated exploratory wells, formations have been proven productive by testing which would otherwise have been passed up as doubtful based on appearance of cores, cuttings, or electrical well logging. On the other hand, there are wells in which cores and cuttings appear to be productive but when tested with either a test tool or installation of casing, salt water or only non-commercial production has been found. In cases such as these, the expense of taking a conclusive drill-stem test is practically nothing compared with the expense of setting casing and testing with other methods.

Improved Tools

Tools designed especially for formation testing have been improved in many ways over the past few years. They are very efficient devices of rugged construction but simplified mechanically to a degree that they will function under the extreme conditions that may be encountered in the deepest wells.

A common arrangement of tools on the drill pipe is such that the formation to be tested is isolated from the remainder of the exposed formations by a packer, the tester being mounted above the packer. After the packer is seated, the valves in the tester are opened by rotating the drill pipe one or two turns and lowering same several inches during rotation.

A similar tester of another design is actuated by releasing a go-devil from the surface which falls through the drill pipe, lodges in the valve, releases the mechanism, and opens the tool.

The arrangement of testing tools and the process of operation isolates the drilling fluid in the annulus above the packer and prevents it from exerting its hydrostatic pressure on the formation being tested; also, the testing procedure permits the formation fluids to flow freely into the drill pipe above the tester.

After the valves of the tester have been open for a period of time and a satisfactory fluid sample in the drill pipe has been obtained, the tester valves are closed to entrap the fluid sample by raising the drill pipe six to ten inches. With the tester valve closed and packer still seated, it is possible to obtain a bottom hole pressure buildup record on a pressure recording device, which may be included as a part of the testing equipment.

Additional raising of the drill pipe will actuate an equalizing bypass tool below the closed tester valve. This will permit the drilling fluid in the annulus to flow through the inside of the packer mandrel and equalize the pressure on both the top and bottom of the packer. The drilling fluid will then contact and seal off the previously isolated formation. With the pressures equalized, the packer will return to normal shape. The packer then can be removed from its seat by raising the drill pipe.

Testing equipment is designed to operate under and to adapt to a multitude of circumstances that may be encountered in the various drilling and field conditions throughout the world. The uses of testing equipment are not limited. These tools may be used in a number of ways to obtain safely the physical evidence of productivity without creating hazardous conditions and without interruption of drilling operations except during the interval required to use the tool. The tester and its various accessories or auxiliary devices are commonly used to obtain information or data under the following conditions:

1. To test productivity of an exposed formation that has been drilled with a full sized hole near total depth of well where productivity has been indicated by cuttings, shows, etc.
2. To test productivity of an exposed formation in a small size cored hole that has been drilled deeper than the full-sized bit in the coring process. It is also useful in confirming the physical information from the core.
3. To test productivity of any exposed formation by using two packers to isolate section to be tested with one packer expanded at base of formation and other packer at top of exposed formation. This is especially useful if an electric well log indicates possible productivity of a formation more shallow than the well depth or in event of several productive formations which must be tested independently.
4. To test productivity of formations through perforations prior to installation of permanent producing equipment.
5. To test the efficiency of a casing cement job before well is drilled deeper or casing is perforated.
6. To test productivity of formations that have been reconditioned by squeeze cementing or for determination of results before installation of the permanent producing equipment.
7. For determination of oil-gas ratios by testing isolated sections of certain

Testing Equipment

Engineer, Halliburton Oil Well Cementing Company

strata or sections of a perforated zone in a producing well.

8. For determination of water level in an exposed formation of either a producing well or a well being drilled.

With any of the above conditions, the testing tools may be equipped with a maximum-indicating recording thermometer and a continuous-recording pressure device. The data obtained with these instruments are frequently useful in analyzing the test procedure. Also, these data are valuable in selecting producing equipment and in providing information useful in calculation of productivity indices and reservoir analysis.

In order to obtain satisfactory tests, it is necessary that the test tools be maintained in good operating condition, clean and free of any extraneous material, greased to prevent rusting, and equipped with proper packing material. Although it is not imperative, testing tools should be thoroughly cleaned after each testing job. It is necessary that the person using the tool be familiar with its construction and he must supervise its use in a well and also supervise the disassembly of tool to clean, service, repack, or replace the various elements subject to wear.

As a safeguard to obtain good tests, some preparation of the well should be made before the testing job is scheduled. The well should be thoroughly circulated to remove a maximum amount of the cuttings, all foreign material such as wood, rubber, or metal from cementing plugs, squeeze retainers, or gun perforation should be removed from the well. The drilling mud should be in condition to remove cuttings and other debris; it should have a low sand content and be of such nature that it has a low fluid loss with a thin filter cake.

When an exposed formation in an open hole is to be tested, the packer setting should be carefully chosen. It should be set in a hard formation which has not washed or eroded to a larger diameter and which will not break down under the forces or pressures during the setting of the packer or during the test.

During the running of a tester in a well, the fluid level on the outside of the drill pipe should be observed from time to time to test the drill pipe for leaks. If a leak should develop in the drill pipe while it is being run in the hole, the drilling fluid will not stay at the top of the hole. This observation should be made while the drill pipe is stationary or while the crew is making up the next stand of pipe. A leak may be small; however, due to the abrasive action of the mud and increase in pressure as greater depths are encountered, the rate of fluid fall in the annulus will become quite large and can be readily detected.

It is advisable to see that the annulus is full of fluid before opening the valves of the tester. If the fluid falls rapidly after the valves are opened, the packer may not be properly seated or expanded to give a perfect seal. In such cases, the drill pipe should be raised immediately to close the valves. The packer may be reseated then and the tester opened a second time. If, however, there is a very slow drop of fluid before the packer has been seated and it continues at the same rate after packer has been seated and tester has been opened, it usually indicats that a porous or permeable formation above the packer is absorbing some of the drilling fluid.

As a precaution against blowouts or flows, it is advisable to keep the annulus full of fluid as the drill pipe is pulled out the hole to recover the test results.

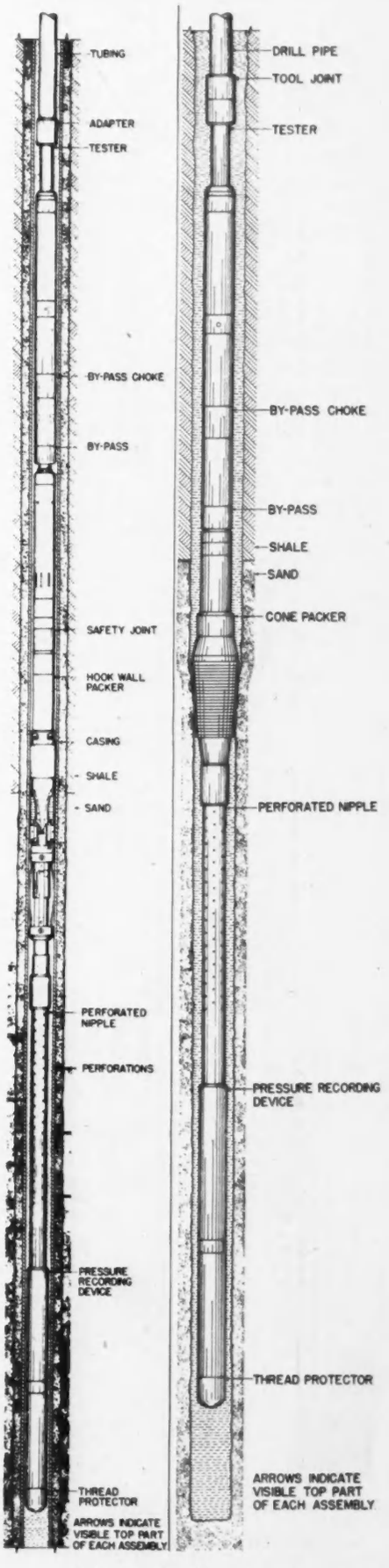
Present-day formation testing procedure was developed for use in average as well as extreme well conditions. The use of a number of auxiliary devices will assure more satisfactory results and will facilitate the adaptability of the tester to the individual well conditions.

Auxiliary Equipment

For instance, some of the following auxiliary equipment is highly desirable to insure maximum safety for many well conditions:

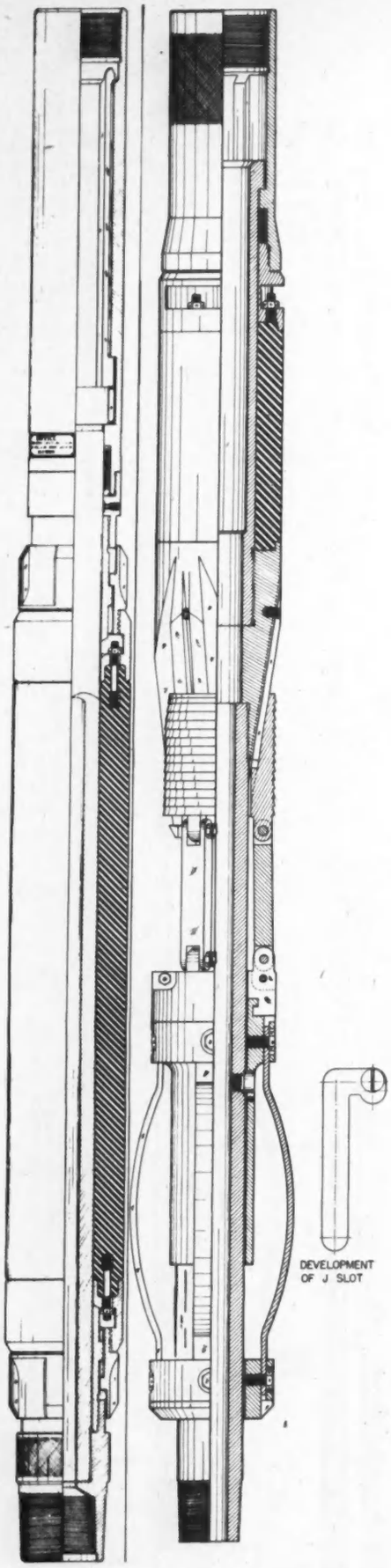
1. Control head. A control head for surface connections should be equipped with a flow manifold and removable high pressure chokes. The control head is provided with tool-joint threads whereby the kelly joint may be attached to the top. If necessary, mud may be pumped into the drill pipe (a) to control the well, (b) to mud off the producing formation, (c) to circulate through a fouled packer, and (d) to circulate and remove the entrapped test fluids.

2. Two-way circulation valve. The function of the tool is that of a safety device. It is constructed in such a manner that it may be opened by application of pump pressure in the drill pipe. In a locked-open position, fluids may be pumped through the annulus or drill pipe in either direction; thus, it can be seen that the tool can be utilized (a) to remove test fluids from drill pipe, or (b) to condition the mud in the annulus. The elimination of the hazards of improperly conditioned mud and the dangers of fire attending free oil or gas is a consideration of paramount importance. After the ports of the circulation valve have been opened with pump pressure, they may be sealed by dropping a bridging ball down the drill pipe. After side ports have been closed with the ball, fluid circulation may be reestablished through the tester and auxiliary tools including the packer. This function



Left: Hook wall packer test.

Right: Cone packer test.



Left: D. E. wall packer.

Right: Type C hook wall packer.

permits circulation to free a packer that is fouled at the bottom of the well.

The circulation valve is usually installed at a distance equal to one or two stands of drill pipe above the tester; however, in many conditions, it may be advisable to vary this measurement considerably.

3. Bypass choke. In event high-pressure conditions exist in a well to be tested, an auxiliary tool known as a bypass choke is usually installed below the tester but above an equalizing bypass. The function of the bypass choke is to restrict the rate of flow of a high-pressure fluid or gas; thus, it is considered a safety device to insure control of a high-pressure well during the test. Various diameters of chokes are interchangeable in the device, some of which have a precision bore and may be calibrated. A calibrated choke is useful in obtaining data for calculation of formation productivity, reserves, and as an aid in selecting permanent well equipment.

Equalizing Bypass

4. Equalizing bypass. A device known as an equalizing bypass is usually installed immediately below the bypass choke if one is used. Otherwise, it is installed immediately below the tester. The primary purpose of the bypass is to equalize the hydrostatic pressure of the column of fluid above and below the packer during the period in which the test tools are being run into the well. Also, it functions as an equalizer during the process of setting and expanding a packer and of releasing and collapsing a packer; the bypass tool makes it unnecessary to lift the fluid column when releasing the packer from its set position. Several types of these devices are commonly used, each being particularly adapted to a specific size of test tool.

5. A safety joint is frequently used as an auxiliary device; and when used, it is usually installed immediately above the packer. The construction of a safety joint is such that the threaded portion may be unscrewed by rotation of the drill pipe at surface, the drill pipe being in tension during rotation. The back-off threads are usually, or should be, equipped with a packing seal arranged in such a manner that fluid pressures do not affect the efficiency of the joint.

6. Many types and designs of packers have been made and tested in the past few years—and by the process of elimination, research, development, and experimentation, it has been found that various types are best adapted for particular purposes. A brief summary of the packers and their use follows:

A. Cone packer. This type of packer is composed of a series of flat rubber and canvas discs mounted on a mandrel in a manner to resemble an inverted, truncated cone. It is limited to relatively shallow formations which are firm and are capable of supporting a portion of the drill pipe weight and hydrostatic fluid column. The cone packer can be used only in holes where the size of the drilled hole has been reduced at the top of the formation to be tested. The reduction in diameter provides a shoulder whereby the fluid seal may be effected. If the formation is relatively soft, a cone packer may be used in conjunction with a sleeve packer. In this case, the cone packer acts as an anchor in seating the sleeve packer and also serves as a secondary seal.

B. Sleeve-type packer. This type of packer is made in many variations of similar design, the more satisfactory being constructed of compounded synthetic and natural rubber formulate reinforced with woven fabric strips molded into certain areas to increase durability, strength, and flexure control. Sleeve-type packers adapted to testing have a steel ring with threaded stud bolt molded into the end of the fabricated body. By this means, they may be interchanged and adapted to standard bodies. Sleeve packers are made with various outside diameters for use in the various sizes of drilled holes.

The sleeve, or wall formation, packer is not limited in application regardless of depth or amount of the open hole. However, it is most effective if set and expanded opposite a sand, limestone, or dolomitic formation. Under some testing conditions, it may be used in casing. The major troubles encountered with all designs of sleeve packers may be traced to erosion or washing out of formations, permitting the hole to become oversize.

A standard rule for selecting proper diameter of sleeve packer: The outside diameter of the packer should be held within limits ¾ to 1½ inches smaller than the diameter of the drill bit. The most common practice is to use a packer having a diameter about one inch less than drill bit diameter.

The common types of sleeve packers are mounted on a steel tube and are equipped with a locking device which holds the rubber sleeve in normal shape as it is run into and pulled from a well. A locking device is activated by rotating the drill pipe and raising and lowering during rotation. By proper movement, a key is placed into certain relationship with a slot which will permit the mechanism to telescope. This telescoping action permits a portion of the drill pipe weight to act upon and expand the sleeve packer. The locking mechanism in this tool will automatically return to the unset position when drill pipe weight is released.

Caution must be exercised in applying the necessary drill pipe weight to expand wall packers. Excessive weight can damage the rubber sleeve or kink the supporting anchor. Field practice is to use a weight indicator and limit the weight on packer between one to four points.

C. Hook-wall packers. These packers are manufactured in various designs. In general, the most common type used in testing consists of a locking mechanism that can be set, locked, unlocked, and reset at any depth within a cased hole. This is a very important factor in testing wells that have a series of separated formations which are perforated. The locking mechanism is equipped with friction drag springs which contact the casing and provide the means whereby multiple settings may be made. The mechanism may be locked or unlocked by raising or lowering the drill pipe and rotating same several turns. As the tool is unlocked, a set of slips attached to the friction drag springs contacts the inner surface of the casing and prevents any further downward movement. Application of drill pipe weight causes a short sleeve type packer to be expanded to the inside diameter of the casing and effect a fluid seal.

Several kinds of packers are used on hook-wall devices. One common design is similar to the sleeve packer used in

open hole formation testing. Another design is constructed of molded rings (composed of rubber and canvas) with steel spacers between each pair of rings. This type is commonly called a production ring packer.

These two types of packers are usually interchangeable and it is common practice to standardize on the type that gives the most satisfactory results within a given area.

D. Various combinations of the above packers may be made for isolation tests. Packers may be set above and below any formation in the open hole or in a section of perforated casing. A productivity test on an isolated formation may be made independent of other formations exposed to the same well bore. With various combinations of packers and a hook-wall packer as the upper unit, it is advisable to remove the slips in order to facilitate the simultaneous setting of two packers.

7. Anchors. Anchor pipe for use with formation wall packers is more important than generally supposed. It must be made in various lengths in order to assemble the total required for the individual test on a well. It must be of thick wall steel tubing which will support some of the drill pipe weight in addition to the hydrostatic fluid forces transmitted by the cross-sectional area of the packer. It must be perforated or slotted to provide entrance for formation fluids coming from the strata being tested.

The perforations or slots should be of such design that cuttings and other well debris will not enter, lodge, or restrict the flow of fluid.

Field conditions within a given area will determine the optimum dimensions of the slots or perforations. The total area of all the slots or perforations, however, should be at least one to 1¼ times the cross-section area of the drill pipe if well conditions will permit.

Lower end of anchor should be closed with a steel cap to prevent anchor from being driven into the formation at bottom of hole; yet, it must penetrate all of the cuttings, debris, etc., and come to rest on a firm support. The cap usually has several metal projections welded on sides and end to act as anchors to prevent lower end of pipe from rotating as test tools and packers are being set.

8. Pressure-recording devices. A pressure-recording device is usually included in the auxiliary testing equipment. Its function is to supply data regarding the action of the test tools as well as to supply data on the productivity of the formation undergoing test.

Pressures Recorded

The following pressures are recorded on a pressure-recording device which is usually installed in the anchor below the packer:

A. The increasing hydrostatic pressure of the drilling fluid as the test tools are being lowered into the well.

B. The change in pressure at the time the packer is being seated and expanded.

C. The pressure reduction that occurs as the tester valves are opened to permit the fluids below the packer to flow into the empty or partially filled drill pipe.

D. The increase in pressure as the drill pipe fills with fluids being produced from the formation below the seated packer.

E. The rate of buildup of the natural formation pressure after the tester valves have been closed. If time interval be sufficient, the static bottom hole pressure will be recorded.

F. The change in pressure that occurs as the packer is unseated, and the hydrostatic pressure of the drilling fluid as it is permitted to act upon the formation below the packer.

G. The decreasing hydrostatic pressures of the drilling fluid as the testing tools are removed from the well.

The pressure vs time data taken as mentioned above under "D" and "E" are frequently used by petroleum engineers in determining productivity, etc. These data are useful in selecting the proper size production equipment to be used on the permanent installation.

In some conditions such as: (a) the space limitations below the packer will not permit use of standard pressure-recording device, (b) the use of two pressure-recording devices to insure against failure of one instrument, (c) the recalibration of a precision choke, etc.; a special pressure-recording device may be installed. The special recording device is constructed in such a manner that it may be installed in the drill pipe above the packer but below the tester. The special pressure-recording device is always installed below the bypass choke in order that the bottom hole pressure or the upstream side of pressure acting on the choke will be recorded.

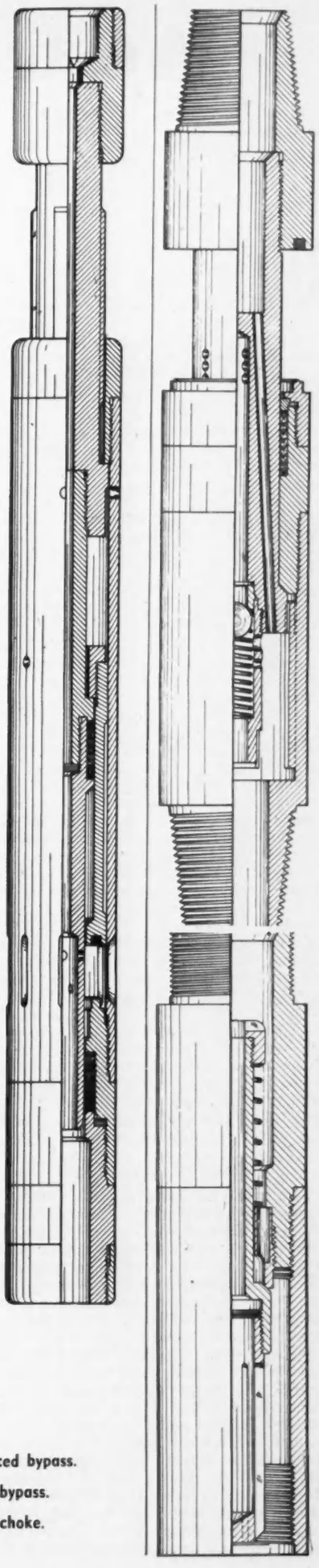
Same Design

The pressure-recording instruments of both devices are of the same design, the major difference in construction being in the outer case. The pressure-recording device for use with testing tools is a very sturdy instrument and it does not require the extreme care in handling so common with laboratory instruments. The percentage of accuracy of an average high pressure gauge is within 1½ to 2½ percent at full scale deflection of 10,000 pounds per square inch and the accuracy is within ½ to 1 percent at half scale deflection. Other calibrations are proportionately more accurate.

Several calibrations of pressure gauges are used for various well conditions. Common calibrations are for recording maximum pressures of 1500, 5000 8000 and 10,000 psi.

9. Temperature recording device. A temperature recording device may be installed on lower end of anchor. The instrument is usually of the maximum indicating type, the highest temperature encountered in the well being permanently recorded on a removable calibrated chart.

The use of temperature information is often valuable in selection of type of cement for setting casing or subsequent remedial work. Such information is valuable to petroleum engineers in making studies or analyses of producing conditions, well productivities, and reservoir reserves of oil or gas.



Top left: Pressure balanced bypass.

Top right: California bypass.

Lower right: Bypass choke.

Western Delaware Basin

OIL POSSIBILITIES

By ROBERT R. WHEELER
Consulting Geologist, Oklahoma City

AN EFFORT is made here to review the problems and progress of exploration in the western flank of the Delaware Basin of Trans-Pecos Texas and to consider the factors necessary for oil accumulation in this inadequately explored oil province.

The area is that portion of the western flank of the Delaware Basin west of the Pecos River, with particular emphasis on eastern Culberson County, Texas, and southwestern Eddy County, New Mexico. The basin is limited on the north by the Capitan reef escarpment trending southwestward from Carlsbad to the crest of the Guadalupe Mountains. The faulted Delaware Mountains and adjacent Salt Flat graben bound the province on the southwest.

Perhaps the most obvious factors that have delayed proper testing of the region are (1) the wildcat failures of many false surface "structures" which were caused by salt solution or secondary distortion of the late Permian evaporite sequence rather than tectonic movements; (2) the fractured and distorted evaporites have prevented seismic mapping due to the confusing reflections associated with these joint planes; (3) the typically poor recoveries so far discovered in the upper beds of the Delaware sand section have led to a popular prejudice against its porosity and potentialities as a reservoir rock; and (4) geologists have been discouraged by the scarcity of closed structural features, while some of the accumulation, for example, the Wheat pool (estimated ultimate recovery 10 million barrels, 2000(+) barrels per acre) is localized purely by lateral variations in sand porosity. It will be the purpose of this report to show that the west flank of the basin warrants much more exploration, that the oil possibilities have not been generally appreciated, and that the next few years will show a very intensified search for new prospects.

Status of Exploration

The western flank of the Delaware Basin may be divided into two provinces as far as surface geology is concerned. The eastern half is overlain and more or less obscured by the Ochoa (late Permian) evaporites extending from the Pecos River Valley westward to the Delaware outcrop in central Culberson County, an area in which surface geology has meant little, where seismic work has consistently failed, and where gravimetric and magnetometer surveys are the only methods for locating structural features. The western halves where the eroded Delaware Mountain group is exposed and easily mappable westward to the crest of the upfaulted Delaware Mountains. For more than 20 years, surface mapping parties have combed this western area for structural traps with little success, although very few prospects have been drilled to date. Seismograph work also has been conducted and is still in progress.

In the eastern province most of the tests have been drilled on promotions of various kinds or upon doubtful surface structures and a very few in recent years upon gravity or magnetometer surveys. For a number of reasons, including the abundance of tax money and the excitement caused by Argo's deep test in the vicinity of Balmorhea, which found a possibly commercial show of oil in the pre-Delaware Bone Springs formation, there has been an important revival of interest in the entire western flank of the Delaware Basin. Where leases formerly were bought in many thousand acre blocks for 50 cents or a $1 bonus, this recent activity has boosted the price to several dollars an acre throughout most of the region. Geophysical work of all kinds has been intensified, especially in the last two years. It seems likely that another factor that has influenced this revival is the surface mapping, gravity work, and leasing by The Superior Oil of California. This has been concentrated along a northwest-southeast trending feature that is thought by the writer to constitute the basinward extension of the well-known Huapache monocline of the bordering Guadalupe shelf facies in western Eddy County, New Mexico. One prospect along this trend is now being core-drilled (located in northwest of Section 9, T. & P. Block 60, T-2, Culberson County, Texas).

The main objective of drilling in the basin probably will continue to be the Delaware Mountain group which is composed primarily of sandstones, rather fine-grained with variable porosity and interbedded with black organically rich shales and limestones totaling more than 3000 feet in thickness. Depending upon Argo's success with its pre-Delaware shows, future exploration may consider this an objective for oil. The Lower Permian, Wolfcamp is even less understood as to porosity and oil possibilities. Most of the pre-Permian oil objectives of western Texas including the Simpson and Ellenburger are probably present as indicated by the Humble Oil & Refining Company deep test, Humble B-1 Reynolds Cattle Company, which penetrated 4010 feet of Permian in shelf facies, 260 feet of Simpson sand, shale, and limestone, 930 feet of Ellenburger dolomite and stopped in Cambrian (Bliss) sandstone at 5417 feet. It is in the Apache Mountains on the southwestern margin of the Basin.

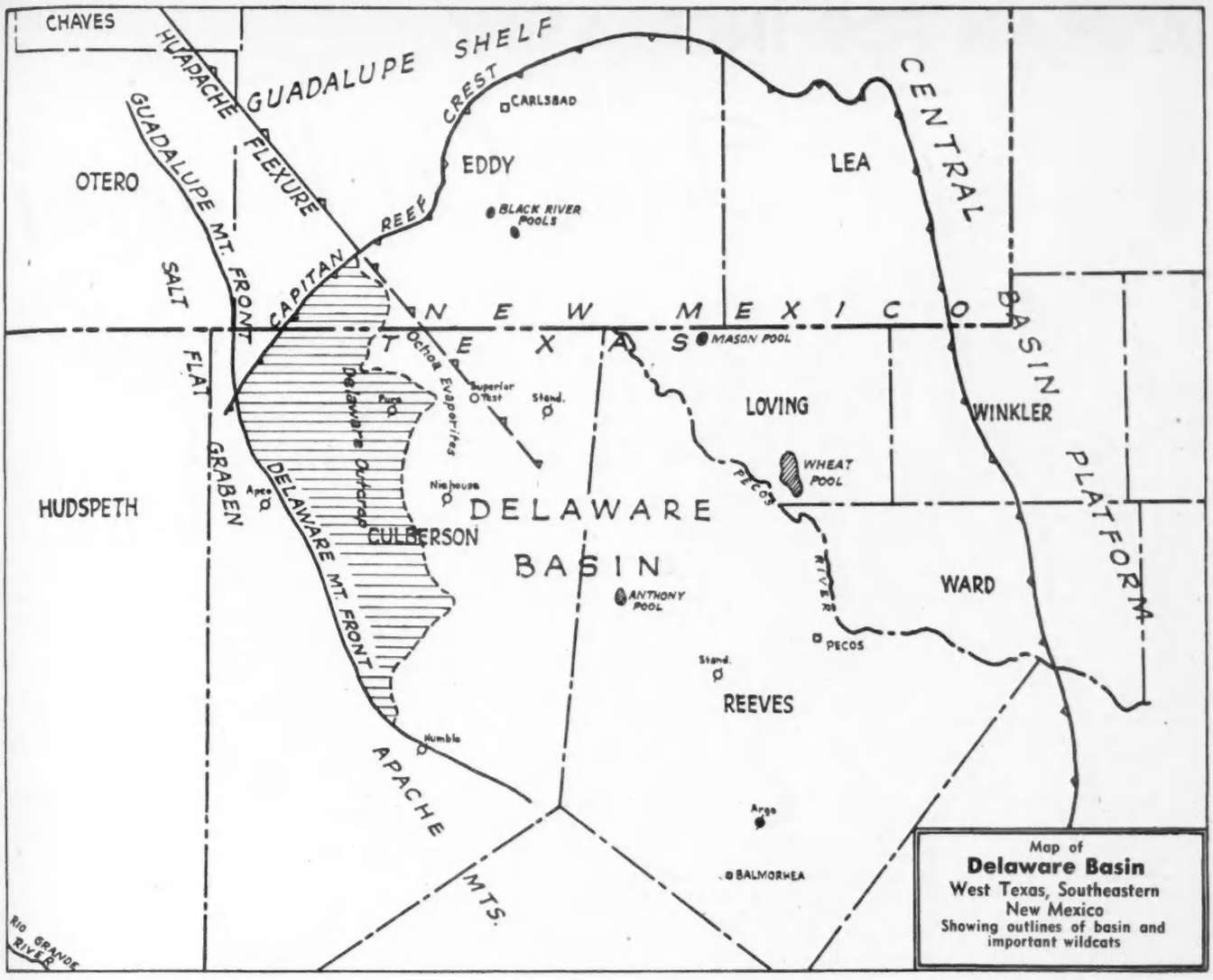
Since the Delaware group is the main objective because of its many shows of oil and thickness, this discussion is concerned chiefly with its possibilities. Surface and subsurface sections indicate that although sands are locally tight, porous zones are generally present while the Lower Delaware is more coarse-grained and porous than the overlying sequence. In other words, the porosity of the Delaware is not appreciably different from many Pennsylvanian sands producing in Oklahoma, characterized by the same tendency for lateral variations in grain-size and sorting but with the enormously greater thickness constituting an unparalleled oil objective.

Since closure has been so rarely encountered in the basin, it is not surprising that the few shows and production have come primarily from the upper few feet of this thick sequence. But consider the potentialities of a well-closed structural feature with expectations of many hundreds of feet of oil column in which porous sand units are separated and trapped by the interbedded impervious limestones and shales. As far as source-beds for oil are concerned, the Delaware Mountain group contains a great aggregate thickness of interbedded black limestones and shales whose rich organic content affords an ideal association of source and reservoir beds. These black shales and limestones are so rich in hydrocarbons that they yield oil on distillation and give off a strong odor of oil when fractured, while the upper beds of the Delaware almost always show oil or gas regardless of structure.

Little Closure

It would appear that the most important factor necessary in the basin for oil accumulation is structural closure and it seems strange that, in so vast a province, so little closure has been discovered. It is suspected that the magnitude of folding should increase in the areas which are most closely associated with the structural movements that created and rejuvenated the Delaware Basin. Since the geologic history of the basin has been primarily one of eastward tilting due to the arching upward of an area west of the Delaware Mountain front, the larger structural features should lie in the western portion of the basin. However, years of diligent search for prospects in the easily mapped western area have located little but anticlinal noses locally trapped by cross faults. In spite of the scarcity of closed surface structures in the high western areas or proven structures in the deeper basin areas to the east, there is nevertheless reason to believe that a very large structure is present across the west flank of the basin lying on the projection of the Huapache axis of the Guadalupe shelf. Along this trend the top of the Delaware lies only 1500 feet below the surface. To understand this concept it is necessary to visualize the geologic history of the entire region which may be summarized in the following salient events:

1. Following the warping and truncation of the pre-Permian sequence (Ellenburger, Simpson, Devonian, Mississip-



pian, and Pennsylvanian), the entire West Texas region was overlapped by the Permian with general masking of older structural features.

2. The early Permian (Wolfcamp and Bone Springs) deposits were tilted and locally truncated sufficiently to necessitate later Permian overlap.

3. In the Trans-Pecos region the Upper Permian (Guadalupian and Delaware) facies thinned southwestward upon an inferred pre-Cambrian arch west of the present Guadalupe-Delaware Mountain fault zone. Independently, two distinct sedimentary facies developed because of the initiation of the Capitan reef along the margin of the Guadalupe shelf, and its basinward growth into the contemporaneously deposited Delaware Basin sediments. Both the sand, dolomite and evaporite section of the shelf and the equivalent thick sand and calcareous shale deposits of the basin show this westward thinning.

4. The Guadalupian rocks were warped into superficial flexures paralleling the underlying reef crests and were cut by cross-folds, the most pronounced of which is the Huapache monocline which has no parallel in magnitude or persistence in the Guadalupe shelf facies.

That this Huapache flexure was intermittently rejuvenated throughout Guadalupian (Grayburg, Queen, Seven Rivers, Yates and Tansill) time is indicated by thinning of these formations and cross-bedding upon the steep northeast flank and by the increase in reversal in lower beds observed in deep canyons bisecting the structure. Even the massive Capitan reef was warped by this cross-fold, by which one must infer that the underlying basin sands are comparably folded.

5. The latest Permian (Ochoa) evaporite series that filled much of the Delaware Basin locally crossed the Capitan reef and overlapped the Guadalupian shelf, but, due to post-Guadalupian tilting, none of the Ochoa sequence was able to transgress the reef west of the Pecos. Therefore, of the constituent Castile, Salado and Rustler, even the top of the Rustler lies many hundreds of feet below the Capitan reef escarpment in the tilted western flank of the adjacent Delaware Basin.

6. Repeated tilting occurred during Ochoa time so that the evaporites thin westward and show evidence of unconformities in north central Culberson county as they thin upon the basinward extension of the Huapache flexure. By these observations the writer estimates that the Guadalupian and equivalent Delaware beds were repeatedly tilted eastward during late Permian time with one-third of the uplift accomplished during Guadalupian pre-Ochoa time, another third during Ochoa time, and the remainder in post-Cretaceous time, presumably during Tertiary block-faulting of the Guadalupe-Delaware Mountain front.

The economic importance of these geologic events is apparent when one realizes that repeated tilting of the Delaware sands should have drained oil accumulation in structural traps that did not possess comparable west reversal. On the other hand, the rejuvenation of folding along the Huapache trend demonstrated in the Guadalupe shelf should have been duplicated in the basin with comparable lensing sand and stratigraphic trap possibilities in the Delaware sequence. Therefore, if the fold axis can be demonstrated to have persisted across the west flank of the basin we may expect its basinward flank to have localized extensive stratigraphic traps in the overlapping Delaware sands.

It is especially interesting to note that along this general trend seeps of oil have been observed along Delaware Creek, that the exposures of Ochoa limestone yield a strong oil-odor when broken and that several shallow water wells have had persistent seepages of sweet gas from the fractured Castile anhydrite where the Delaware sand lies at shallow depths.

Finally, it is reasonable to suppose that closed folds may be present in the Ellenburger, Simpson and other pre-Permian oil objectives, features that should have been obscured by Permian deposition but may be mappable by seismic methods in the western areas of Delaware outcrop.

A PLAN FOR INCREASING *Texas Oil Recovery*

THE oil industry is such an important factor in the business, social, and economic life of Texas that all practical measures which may be proposed to maintain profitable production deserve general support. Such measures may be designed to secure from older fields recovery of oil, which will not be obtained by the primary methods now being employed, or they may serve to insure the more efficient recovery of oil from recently discovered fields and from fields yet to be discovered. The problem, therefore, which now exists in Texas is twofold, involving both the correction of past mistakes and their future prevention.

The continued discovery of large oil reserves in almost every part of Texas during the course of several decades has served to maintain production at such levels that limited attention has been given to the procurement of any recovery other than that which could be obtained by the natural and, in earlier days, the unrestricted flow of oil from the reservoirs, and, subsequently, the lifting of the oil to the surface by artificial means. In certain of the other, less favored oil-producing states, as the primary production of their fields has declined and as new discoveries have become less frequent, the oil industry has been preserved by the application of secondary methods of recovery to the oil remaining in the reservoirs. As a matter of fact, in some of the older oil-producing regions, secondary recovery accounts for the major part of the production of oil.

Here in Texas, even after the great demand for oil which resulted from recent war conditions, the apparent abundance of oil has tended to encourage a complacent attitude toward the future of the industry. Admittedly, it is difficult to create much concern over a possible impending oil famine when there are individual wells in Texas which have potentials greater than the entire production in quite a few other states. However, it should be recognized by everyone having any degree of familiarity with the production of oil in Texas, that there are fields in this state which are approaching or are in various stages of abandonment, that have not been produced with the benefit of modern engineering knowledge and without regulations which would serve to utilize most effectively the natural forces which bring oil from the reservoir to the well bore. Fields which have been so produced may offer fabulous opportunities for increasing oil recovery by secondary methods.

Even though no immediate shortage of oil in Texas can be foreseen, it does appear reasonable and prudent to consider ways and means whereby a maximum economic recovery can be obtained from every field. Vast sums of money are being expended every year to find new oil fields in Texas, but up to the present little attention has been given to the recovery of oil already discovered but which will not be produced by primary methods. In fact, when consideration is given to the substantially increased recovery which has resulted from the application of secondary methods in other states, it can be considered most unfortunate that any oil field in Texas should reach the abandonment stage without having received a complete engineering investigation to ascertain its susceptibility to secondary operations. For this reason, the problem of possible successful application of secondary methods becomes vitally important when the time approaches in the life of any oil field that the cost of production becomes equivalent to the income derived from the sale of oil.

Solving the Problem

Having stated in some detail the problem of effective oil recovery and the conditions which control it, consideration can then be given to its solution. Fortunately, there is an extensive background of experience and precedent in other states which can serve as a guide. To this can be added the encouraging results that have been obtained in recent years in a few limited areas in Texas, all of which, when combined, encourages the thought that there probably are outstanding but little known secondary recovery possibilities in certain parts of the state. Likewise, as emphasized previously, Texas still has the time to make long-range plans and to conduct extensive research without being confronted with an actual shortage of oil. Consequently, in possibly no other state are conditions so propitious for the type of study and research which should produce the best results.

By PAUL D. TORREY
Consulting Petroleum Engineer, Houston, and National Chairman, Standing Subcommittee on Secondary Recovery Methods, API

The experience of other states that have become concerned with the maintenance of their oil industry emphatically indicates that the most effective research can be performed and coordinated on a state-wide basis. This may be done by direct support from the state, by trade associations, or by combined action of government and industry. The work of individuals and companies along these lines, of course, should not be disregarded, but should be utilized to the most practical extent. Likewise, appreciative recognition can be given to the fine work of the Bureau of Mines and to the contemplated work of the Interstate Oil Compact Commission, but this work, although of unquestioned value, has generally some national aspects which sometimes will prevent direct and detailed consideration of the problems existing in all parts of any individual state, and, therefore, may be supplemented profitably. Texas can and should benefit to the maximum possible extent from information developed extraneously, but it has its own particular problems which can be studied better under the auspices of a program of its own initiation and direction.

It is the writer's observation that the best direction for studies on oil recovery problems can come through state agencies which are empowered by law to regulate the production of oil and gas in the conservation of natural resources. Appropriately, then, in Texas the State Regulatory Body might be given the task of sponsorship and general supervision of research in the recovery of oil as a comprehensive measure of conservation. Fortunately, splendid facilities are available for research on oil recovery problems in certain institutions of higher learning in Texas which could be utilized with little delay if adequate financial support were provided. This program, certainly, should be of such range that some assurance of employment security will atract men of the highest caliber, and, of course, the program should be so financed that the very best talent can be secured. The objectives are so great and Texas is so richly endowed that there is no point in dealing in small change. It is believed that an oil recovery research program would benefit from the assistance of an advisory committee made up of petroleum engineers and technologists who have had actual experience in secondary recovery operations, which could meet periodically with those in actual charge of the work to review progress and to help in the formulation of future plans.

The chief shortcoming of research on oil recovery problems in some of the other states, as the writer views the situation, has been its uncertainty. Either too little time or too little money has been available, and the oil industry has

Presented before the North Texas Oil and Gas Association, Wichita Falls, Texas, March 8, 1947.

Rex Field Engineer

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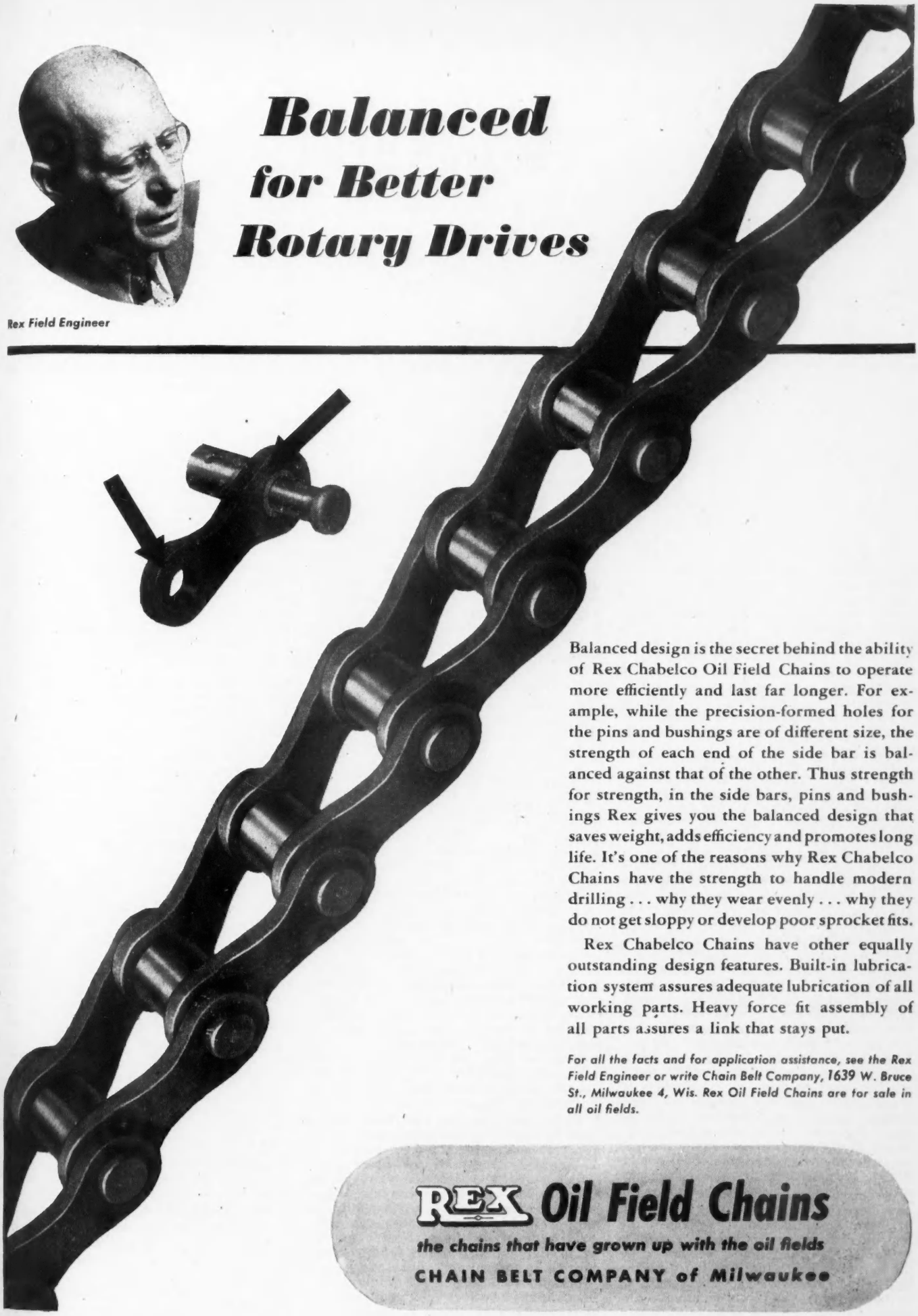

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been prone to expect tangible results too quickly. This mistake should not be repeated in Texas, particularly when consideration is given to the magnitude of the work and the diversity of conditions controlling the production of oil.

Unique Problem

There can hardly be any disagreement with the conclusion that Texas should not have to depend on other states for information on the best methods for securing the maximum economic oil recovery. Obviously, up to the present time much of the secondary recovery technique that has been employed in Texas has been an importation from other states. Notwithstanding its great value, such information is definitely inadequate. Texas cannot expect, for instance, that the ambitious programs on recovery research being carried on in Pennsylvania, Illinois, Arkansas, and other states will give proper consideration to problems peculiar to Texas, such as the performance and recovery from the great limestone reservoirs which occur in its northern and western regions. Therefore, a program of research designed specifically to deal with Texas' own problems and conditions will prove to be the only entirely satisfactory approach.

As the first step in such program, it is believed that a complete survey of the geology and reservoir performance of every oil field in the state should be made in order to determine those fields which have or will have sufficient residual oil content to make successful secondary recovery possible. Such a survey is most important, to assist in preventing inevitable failures which will result from attempts to apply secondary methods to fields where efficient primary recovery already has taken place or will take place, or to fields where other detrimental factors such as drilling depth, inadequate water or gas supply, etc., may preclude successful secondary recovery.

To reassure any who may be suspicious of the immediate urgency for a state-wide study of secondary recovery possibilities, because of the record of good management connected with many of the fields discovered in recent years, it can be cited that this initial study should determine quickly those fields which do not possess attractive secondary possibilities and, thereby, eliminate them from further consideration. Generally, this is not too difficult to do for the fields which have not had efficient primary recovery usually are more susceptible to the successful application of secondary methods. Also, in most cases it will be found that poor primary recovery efficiency has resulted from the lack of uniform, natural water drive or of an effectively expanding gas-cap. Therefore, in North Texas and West Texas, for instance, there are many fields where poor primary recovery history immediately indicates promising secondary recovery possibilities. Fields of this type and in these regions, undoubtedly, should receive early and the most detailed consideration.

Following such a survey, the specific problems of promising fields should be considered, and, in this connection, much attention should certainly be given to the enormous reserves known to remain in presently discovered and proven limestone reservoirs having low permeability and which have not had the benefit of active, natural water encroachment. The present recoverable oil reserve of Texas, very conceivably could be doubled if a practical method for the recovery of the oil held in such reservoirs could be developed.

Assuredly, much thought and attention should be given to the physical chemistry controlling the displacement of oil from every potential secondary reserve in the state.

By cooperative planning with the operators, a definite program for every field having secondary possibilities should be developed with the fixed objective of securing the maximum economic recovery of oil.

In studies of such broad scope and nature the petroleum engineers should have the active assistance and collaboration of attorneys, mathematicians, chemists, physicists, geologists, and experts in various arts and sciences, but primarily and fundamentally the problem at hand requires the guidance and direction of experienced petroleum engineers.

An immediate problem deserving early attention in connection with an oil recovery study is the question of proper well completion. Secondary recovery might be immediately feasible in quite a few Texas fields if it were possible to utilize the existing wells. Unfortunately, in many instances wells have been so improperly shot or cased that they cannot be used satisfactorily for the injection of gas or water into the oil-bearing reservoirs. Thus, even though a field may not have many abandoned wells, much new drilling, generally at considerable expense, may be required to permit successful secondary recovery. Therefore, in every field where secondary recovery possibilities may be indicated, engineering plans should be made to space wells and to complete wells in a manner which will permit orderly and effective gas or water injection.

Too much emphasis cannot be placed on the conservation of gas, especially in reservoirs where oil recovery is going to be dependent on dissolved gas drive. The loss of solution gas is one of the most detrimental things that can happen to any oil field, for as the gas is released from solution the viscosity of the crude increases. Increased viscosity reduces the efficiency of the primary recovery process and at the same time it makes secondary recovery more difficult on account of either the higher injection pressures which will be required to move the less mobile crude, or the closer well spacing which will be necessary to permit the recovery of the remaining secondary reserve within an economic time period. Also, and of great importance, the loss of solution gas serves to reduce the effective permeability of the reservoir rock to oil and to increase it to gas, which results almost inevitably in difficult problems of channeling and bypassing of the injection media which may seriously effect the possibilities for successful pressure maintenance or secondary recovery.

From much of the foregoing discussion it can be concluded that secondary recovery methods should never have to be applied except in the older fields which have had inferior primary recovery. The writer is convinced that pressure maintenance commenced during the early life of a solution-gas drive field is generally the preferable method of production, providing definite possibilities of maximum oil recovery in a minimum time period. In addition, the economies in both development and production costs resulting from continued flowing production should be self-evident. It is downright tragic to see so frequently vast sums of money being spent for artificial lifting equipment when it could be used so much more effectively for gas compressors or for water pumping plants to maintain reservoir pressure. Furthermore, every producer who is faced with corrosion problems, and there are many in this category in Texas, can understand that any prolongation of the producing life of a field rapidly increases maintenance costs brought about by the necessity for frequent equipment replacements. Too soon, in many cases, the high cost of replacements and repairs or of chemical treatment causes the abandonment of wells with the loss of substantial oil reserves. In consequence, it is truly a measure of conservation to employ methods for the most expeditious recovery of oil in fields whose producing life may be terminated prematurely by corrosion.

Unitization of Fields

Another important factor which is deserving of attention in any plan for increasing recovery is the question of unitization of oil fields. Recently, considerable opposition has been expressed to legislation to facilitate unitization in Texas. No comment is appropriate in this discussion on the particular merits or demerits of the proposed bill in question. However, the writer believes firmly that opposition to the general principles of unitization should be condemned severely as shortsighted and stupid policy insofar as the possibilities for many secondary and pressure maintenance projects are concerned. The fact is that some of the most successful secondary recovery projects with which the writer is familiar would not have been feasible had they not been unitized. Clearly, the oil industry should recognize that a minority of many times unscrupulous and avaricious royalty or lease owners should not be permitted to obstruct or defeat a program of undisputed conservation designed to increase substantially the recovery of oil from any field. It is for this important reason that the need for legal as well as scientific assistance has been emphasized as being essential to a balanced program for increasing oil recovery.

The writer is informed that over half the taxes coming to the State of Texas and its counties is derived from the oil industry. This source of income is so important that it is inconceivable that anyone conversant with the situation could possibly object to a reasonable plan having as its principal objective the maintenance of the same. However, if such work is to be undertaken by the state, as it should be for the general benefit of Texas and its people as well as for the oil industry, it must have the approval of both the legislative and executive branches of the government. To secure this approval the members of the legislature and the governor must be made familiar with the sentiment of the oil industry favoring such a program and the benefits which may be expected to result from it. We have a heritage that is too valuable to be trifled with, and in future time our actions will be condemned, as they have been in other states, if measures are not adopted to insure the maximum, economic recovery of oil. The general support by the oil industry of this plan of true conservation should insure its success.

Supreme Court Narrows Protective Scope of Many Patents

By R. WERLIN
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IN AN opinion rendered November 18, 1946, in a patent case styled *Halliburton Oil Well Cementing Company vs. Cranford P. Walker et al,* the Supreme Court announced certain principles defining the scope of the patent protection to be accorded to many inventions which will affect a very large number of patents.

The principles announced probably will be condemned by many as "destructive of our patent system." Whether or not that be the fact, inventors, attorneys and commercial developers of patented inventions will have to carefully reevaluate a great many patents in order to redetermine the degree of protection which they may now be expected to afford for the inventions they cover.

The principles announced by the Court apply particularly to the very large class of patents covering improvements in apparatus, or socalled "machine" patents, such as those upon which many of the present-day oil tool manufacturers have founded and are developing their businesses. Generally speaking, most apparatus patents cover improvements in existing devices and cover combinations of several apparatus elements, each of which is individually old, but which are combined in some new manner to produce a new and improved result. The invention in such cases is considered to reside in the concept of the particular combination employed to produce the new result, rather than in any of the individual elements employed in the combination.

Issue in Case

The principal issue in the case under discussion involved a relatively narrow question of the degree of definition in patent claims required under the patent statute with respect to an element, itself old, which was introduced into a preexisting combination to produce the new combination productive of the improved result. The decision of the Court on this issue did not depart from rules which were well established with respect to combination patents of the class here involved long before the Court assumed its present composition. However, the redefinition of the rules governing this issue will itself probably require considerable restudy of patents largely because, until relatively recently, the Patent Office has not followed closely the rules, as established by earlier decisions of the Supreme Court, and was lax in applying the law. Claims were granted for improvement patents which were much broader in scope than should have been permitted.

In addition, however, in its opinion respecting the central issue of the case, the Court announced certain additional principles respecting combination claims of improvement patents generally which do appear to be a substantial departure from existing well established concepts, and which, together with the redefinition and extension of the rule applicable to the principal issue in the case, will unquestionably restrict the scope of the protection heretofore afforded by improvement patents of the large class involved and will, it seems clear, greatly narrow the limits of the legal monopoly heretofore enjoyed under such patents.

The additional principles announced by the Court are to the effect that a patent on a machine is not infringed unless the patentee can show that the alleged infringing device was (a) generally recognized to be a proper substitute for the novel element of the patentee's device at the time of the patentee's invention and (b) that the substituted device was not "invented" after the date of the patent.

Whether or not these principles are merely logical extensions of pre-existing fundamentals of our patent laws and are, therefore, entirely sound, may be debatable and probably will be debated very extensively; but there seems no question that these principles, if taken at their face value, do require major revisions in what have come to be generally accepted as established concepts with respect to the degree of protection afforded by combination patents, with respect to the form and extent of the disclosures to be made in such patents, and with respect to the form of the claims which must be drafted to cover such inventions. Since the writer cannot hope to predict all the possible effects of the announced principles, this discussion will be limited to what appear to be the more immediately evident effects and to some discussion of the underlying philosophy of the Court which governed the announcement of those principles.

Case History

While this discussion could be presented without reference to the specific details of the Walker patent and the facts of this particular case, it is believed that a brief history of the case, and of the specific issues involved, will be of interest, since both Walker's patented device and Halliburton's alleged infringing device are well known and used in the oil industry, and may be helpful to an understanding of the discussion of the significance of the principles announced by the Court. The principles involved are, of course, applicable to patents of other industires and, accordingly, will be a matter of interest to all who are engaged in activities involving patented inventions.

Walker and his associates brought suit against Halliburton under the claims of Walker's patent No. 2,156,519, covering the socalled "Depthograph." The history of this litigation is itself somewhat unique. The claims were found to be valid and infringed by a Federal District Court of California. On appeal, this decision was affirmed by the Circuit Court of Appeals for the Ninth Circuit, which also denied Halliburton's petition for rehearing with an opinion affirming its decision. The case was then taken to the Supreme Court which affirmed the lower court decision by virtue of an equal division of the Court, Justice Jackson being absent from the bench during the hearing and decision of this case by reason of his attendance at the Nurnberg trials.

Halliburton then petitioned for rehearing before the full bench and this petition was granted and the case reargued after the return of Jackson. The decision here under discussion was then rendered, reversing the previous decisions and holding the claims invalid, the Court dividing eight to one, with only Justice Burton dissenting. Justice Frankfurter, while concurring in the decision of the majority on the principal issue involved, reserved judgment on other technical aspects of the opinion.

The patent covered an improvement in apparatus for locating the level of liquid or other obstruction in a well, such as an oil well. The principle employed was to introduce a sound or pressure wave into the well and to time the return of the echo wave from the fluid level or other obstruction. From the information thus obtained, the depth of the fluid or other obstruction could be calculated. This principle was old before Walker filed his patent application and its application to oil wells had previously been patented, by Paul Lehr and Harold Wyatt (Patent No. 2,047,974). However, Lehr and Wyatt had relied in their calculations upon the assumption that the speed of sound in an oil well would be the same as its open-air velocity of 1100 feet per second subject to corrections for changes in temperature, pressure and density of the gas in the well. This assumption proved to be erroneous and their results were, therefore, inaccurate. Walker, who had been working with these patentees and their method and apparatus, hit upon the idea of using the echo waves reflected from the collars on the tubing string in the well as a means for measuring the distance to the fluid level. Since the length of the pipe sections between the collars was generally uniform, the collar echo waves recorded on the receiving apparatus, if made to appear distinctly, could be readily counted on the record chart, and their sum multiplied by the length of a pipe section could be employed in obtaining the unknown distance to the fluid level or other obstruction. These collar echo waves were available in the echo waves obtained by Lehr and Wyatt but their

potential usefulness was unrecognized by them. Walker then added a piece of apparatus by which these collar echo waves could be accented by suitable tuning and amplification and, therefore, made to appear more prominently on the record and easier to count. The incorporation of this accenting or tuning apparatus in the combination with the earlier apparatus, therefore, represented the gist of Walker's invention and there seems no question that by this improvement he attained success where others previously had failed.

In his application, Walker used a flexible diaphragm connected to the top of the well, which was responsive to the echo waves returning from the well and operated a conventional recorder to record these waves. This setup, of itself, constituted nothing new or novel at the time Walker entered the field. Walker illustrated and described a piece of apparatus which was referred to as a "mechanical acoustical resonator." This apparatus, which was also a known piece of apparatus, consisted of a piece of pipe which was connected between the mouth of the well and the diaphragm and which could be adjusted in length to serve as a mechanical tuning device like an organ pipe which could be tuned to the frequency of the collar echo waves and thus amplify or accent these echo waves while "damping out" unwanted frequencies. These accented collar echo waves were transmitted through the flexible diaphragm to appear on the record in relatively sharply accented form. This mechanical acoustical resonator constituted Walker's contribution to what had been done before. He did not in this application describe or illustrate any alternative forms of apparatus for accomplishing his improved result.

Halliburton's device employed a conventional electrical microphone pickup for the echo waves, an electrical amplifier and recorder, and an electrical filter, instead of the mechanical acoustical resonator of Walker, between the microphone and the recorder, for accenting on the record the desired collar wave echoes. Halliburton's complete device was not patented, although the combination of all its parts, except the filter, had previously been patented by Lehr and Wyatt.

Walker's Principal Claims

Walker's principal claims in suit were drawn very broadly to cover the combination of three principal apparatus elements: (1) for producing a pressure impulse in a well in which there was a tubing string assembled with coupling collars; (2) for receiving the echoes from the well and for measuring the time interval between the creation of the impulse and the return of the echo; and (3) for tuning the receiver to the frequency of the tubing collar echoes in order to distinguish them clearly from one another on the record.

In the claims, the specific apparatus elements of the combination were each defined merely as a "means" followed by a statement of the function which that means was to perform. In particular, Walker's specific contribution by way of improvement in what had been done before was defined in the claims as

> "means . . . for tuning the receiving means to the frequency of echoes from the tubing collars of said tubing sections to clearly distinguish the echoes from said couplings from each other."

This phraseology is obviously so broad as to cover any conceivable "means" by which the stated function could be performed, and raised the principal question at issue in this case as to whether or not this language complied with Section 4888 of the Federal Patent Statute which requires that

> ". . . . in the case of a machine, he (the patentee) shall explain the principle thereof, and the best mode in which he has contemplated applying the principle, so as to distinguish it from other inventions; and he shall particularly point out and **distinctively claim** the part, the improvement, or **combination** which he claims as his invention or discovery." **(Is ours).**

It should be noted that the Walker claims were for a **combination** of apparatus elements, each of which was individually old. Furthermore, the combination of the impulse-producing element and the receiving element was also old. What Walker did, in effect, was to add a third old element to the pre-existing combination to form a new combination which produced the new and useful result which he obtained. Under such circumstances, the question boiled down even more narrowly to whether or not the use of functional language of the kind employed in Walker's claim to define his particular contribution of an old element to a pre-existing combination complied with the statute. The Court held that it did not and in so doing relied upon earlier decisions, the principles of which were well established long before the Court assumed its present composition. To paraphrase the language employed in an earlier decision in a case of this kind, the inventor must describe in his claims what it **is** that he has contributed and not what it is **supposed to do.** In other words, he must set forth in his claims some **specific structure** by which the desired function is to be accomplished.

The Circuit Court of Appeals, in upholding the Walker claims, had considered this very point, but in reaching its decision, held that the earlier cases, such as some of those upon which the Supreme Court relied, applied to a particular **product** (such as a starch glue or an incandescent lamp filament) and did not apply to a machine made up of a combination of old elements. The Supreme Court disagreed with this view, saying very bluntly:

> ". . . . We have a different view."
> ". . . We are not persuaded that the public and those affected by patents should lose the protection of this statute merely because the patented device is a combination of old elements."

The extension of the earlier doctrine respecting distinctiveness in claiming a new **product** to claims for **machines,** constituting combinations of old elements, is itself an important clarification of the existing law, if, in fact, it is not a departure from hitherto accepted concepts.

The Court could very well have ended its opinion upon the decision which it thus made with respect to this narrow issue which was the principal one actually presented for its consideration, and in that event, it is doubtful, in the writer's opinion at least, whether any serious argument would have been aroused thereby. The Court's opinion went further, however, and in its discussion of the principles underlying its decision, it announced the two principles referred to above. Although these principles must, for the present, be considered as having the force of law in considering patents of the classes to which they are applicable, they actually constitute a part of the dictum of this case and therein may well lie the basis for future attacks upon their general applicability. In fact, the separate brief opinion by Justice Frankfurter, while concurring with the majority of the Court in its holding that the claims of the Walker patent lacked the definiteness required by the Patent Statute,

> "reserves judgment as to considerations that may be peculiar to combination patents in satisfying that requirement."

The new rules being announced, however, we have to consider what are their principal effects on present practices governing the protection of inventions involving combinations of old apparatus elements.

Effects of Rules

First of all, in view of the decision on the principal issue in this case, the requirement that the claims for mechanical improvement patents must recite some structure definitive of the improvement would appear to have the practical effect of limiting the claims of such a patent rather closely to the specific structure actually described and illustrated by the inventor in his application. The portion of the Patent Statute quoted above in part requires that the patentee shall

> ". . . explain . . . the best mode in which he has contemplated applying the principle (of his invention) so as to distinguish it from other inventions, . . ."

This has been interpreted in the past to mean that the patentee need describe and illustrate only one form of his invention, and this single illustration could properly serve as the basis for language in the claims which was broad enough, not only to cover the particular embodiment illustrated and described but also all others which functioned in substantially the same way to produce the same result. However, the only practical way of drafting claim language sufficiently broad in scope to provide the broad protection to which the invention was thought to be entitled, was to use the words "means" or "mechanism" followed by a statement of the function which that means or mechanism was designed to perform in the combination. But as has been pointed out, that type of language has long been condemned as improper, the decision in the Walker case merely affirming that earlier rule, although it also extended it expressly to machine patents. It becomes necessary, therefore, to introduce into the claims language which is definitive of the structure of the particular improvement. The introduction into a claim of any language in any manner definitive of a particular structure will necessarily be limiting in the claim, irrespective of the breadth otherwise of the language used, and it follows, inexorably, that the scope of protection afforded by the claim must be correspondingly limited. Even if a patentee discloses two or even a dozen different embodiments of his particular improvement, and while it may be possible to draw claims sufficiently broad to cover all the embodiments disclosed, the requirement for the inclusion of some structurally definitive language in the

claims will, nevertheless, make it impossible, as a practical matter, to cover much beyond the limits of the several structures actually disclosed by the patentee.

This difficulty has, in fact, been previously recognized in the decisions governing infringement through the application and use by the Courts of the so-called "doctine of equivalents" which recognized that a claim on a structure, if the claim was properly drawn, could be infringed by another structure which, while varying in detail, functioned in substantially the same way to produce substantially the same result. The range of equivalents applicable to a particular claim was recognized to vary with the nature of the improvement. Thus, a relatively minor improvement was accorded a relatively narrow range of equivalents, while a more important improvement, of the socalled "pioneer" type, was accorded a much wider range of equivalents for the purpose of determining infringement. However, the accepted rule with respect to equivalents drew no distinctions between equivalent structures on the basis of whether or not they were known to be the equivalents of the patentee's structure before or after he made his invention, or whether or not the equivalent structures were themselves inventions and entitled to patent protection.

The Supreme Court in the Walker decision, in the first of the additional principles noted above, while apparently recognizing the applicability of the equivalency doctrine, ruled, in effect, that there can be no infringement by a structure which, although the equivalent in function and result of that covered by the patent, was not known at the time of the making of the patented invention to be the equivalent of the patented structure. What is to be considered "known" or "not known" as an equivalent or substitute for the patented device at the time of the making of the patented invention is a matter on which the writer does not care to speculate, except to suggest the probability that this subject will itself be the basis for much future litigation before any hard and fast rules can be drawn. In any event, the effect of this principle must necessarily be to further limit the scope of the protection to be afforded in the future by an improvement patent.

Retroactive Effect

An unfortunate thing about this further limitation on the protection afforded by patents is its retroactive nature. Many patents have been taken out during the last 17 years which may now be declared invalid because the claims were not drawn in accordance with the doctrine of this case, even though, at the time the claims were drawn, they conformed with what was then the standard practice. Hence the suggested necessity for reevaluation of unexpired patents, which will probably result in the filing of numerous disclaimers and of applications for reissue to narrow the claims of many patents.

The second principle is, in effect, an extension of the first in establishing the rule that there can be no infringement of a patented improvement by a substitue device which was "invented" after the patented improvement. As noted previously, under the old rule respecting infringement it made no difference whether the substitute or equivalent device was patented or not. So long as it functioned in substantially the same way to produce substantially the same result it infringed the patent. Now, under the second principle announced by the Court, if the substitute device is itself an "invention" made after that of the patent, it cannot infringe, even though it be the "equivalent" of the patented device in function and result.

Many readers are no doubt familiar with the situation which has occurred frequently in connection with patents, in which one inventor will have a patent which covers an improvement in a particular machine in relatively broad form, and a later inventor will have a patent on a further improvement over that of the first inventor in the same machine.

The later inventor will be unable to use his patent because in doing so he will necessarily infringe the broader language of the claims of the first inventor's patent, despite the fact that the second inventor's improvement may greatly enhance or improve the operation of the first inventor's machine. On the other hand, the first inventor will not be entitled to use the invention of the second inventor, since it too is patented and its use is the exclusive monopoly of the second inventor. This often leads to stalemate which can be resolved only by trading of licensing rights between the inventors, patent pooling, or perhaps forced withholding of the second patent from exploitation until the expiration of the first, practices which often give rise to illegal monopolies or other means of exploitation which are generally condemned by antitrust laws. The second principle appears designed, therefore, to eliminate this type of conflict and is, in any event, an additional departure from the hitherto established rules and a still further limitation upon the scope of protection heretofore afforded by improvement patents.

Complications Foreseen

In particular, with respect to improvement patents of the large class affected, the law now seems to be that the inventor of an improvement in a previously patented invention will be free to exploit his improvement without interference from the earlier inventor. But this freedom may well have complications of its own.

The writer foresees the possibility of the following situation arising in the future. It will be noted that the Court ruled that there could be no infringement of the first inventor's specific device by a substitute device which was "invented" subsequently. It would now appear that the first question which would have to be determined in an infringement suit is whether or not the device of the second inventor was, in fact, an "invention" and that determination would have many complexities of its own. Then if perchance it was found that the second device was not an "invention," the further questions might arise whether it could then be treated as a "substitute" or equivalent of the device being sued upon, and if so, whether or not it was known to be such a substitute before or after the date of the invention in suit.

Since these new principles are a departure from established concepts, we may ask what is the philosophy of the Court which underlies such a departure. There will be much argument as to whether or not the new principles are, in fact, a departure from established concepts and indeed the Court, in its opinion, has cited earlier decisions upon which it bases its reasons for the principles it announced. Nevertheless, the fundamental philosophy ultimately underlying this decision, as well as other decisions in patent cases particularly, is grounded in the repugnance of our American economic system to monopolies of all kinds. All branches of our government have, from their very inception, fought against the establishment of monopolies generally because of the stifling of competition and other evils to which they often lead. Recognizing the validity of the patent monopoly, which is one of our very few forms of legal monopoly, and the important and necessary part patents play and have played in the development of our economic system, the present Supreme Court, as well as all its predecessors, generally has been most meticulous in surrounding such legal monopolies with every possible safeguard against their improper extension because such extension is deemed to be detrimental to the public interest, while at the same time it has attempted to preserve the important incentive factor supplied by the limited monopoly extended through a patent, which is in the public interest through its constitutionally stated objective "to promote the progress of science and the useful arts."

How then are we to preserve this major objective, if the incentive therefor afforded by the patent monopoly is hedged about by such restrictive rules as those announced by the Court in this case? We must keep in mind that in its decision and opinion in this case, the Court was dealing with a particular class of patents, even though it is a very large class, which deal with improvement patents on machines. The Court made no attempt to apply the announced rules to so-called "basic" inventions, whatever such inventions may be, or to combinations which include elements which are "new" in the literal sense. The Court was dealing only with that class of patent in which every individual element of the combination was already known, and its opinion and the rules it announced were clearly for the purpose of preventing abuse of the monopoly granted by such patents. The Court stated:

> "Patents on machines which join old and well-known devices with the declared object of achieving new results, or patents which add an old element to improve a pre-existing combination easily lend themselves to abuse. And to prevent extension of a patent's scope beyond what was actually invented, Courts have viewed claims to combinations and improvements or additions to them with very close scrutiny."

The Court then quoted with approval from a decision respecting these kinds of combination patents rendered by an earlier Supreme Court in 1874 in which the "great ends" intended to be accomplished by the Patent Act were set forth, as follows:

> ". . . . (1) That the Government may know what they have granted and what will become public property when the term of the monopoly expires. (2) That licensed persons desiring to practice the inven-

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Figure 1. Offsets in the legs of this versatile hydraulically operated A-frame permit it to be laid back across the truck cab.

A-Frame Handles Difficult Jobs

Figure 2. In elevated position, top sheave overhangs rear of truck by approximately eight feet, permitting handling of many otherwise difficult jobs.

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COPING with difficult problems in connection with the handling of heavy equipment usually is the rule and not the exception in oil field construction. Practically all heavy lifting and installation jobs are handled with the aid of the conventional truck-mounted A-frame and hoisting winch, but frequently even this well-known and usually overworked tool cannot cope with certain situations that arise in the course of a day's work in rigging up a new derrick or well installation.

One enterprising oil field electrical contractor has constructed and patented an unusually efficient power-operated A-frame of novel design and installed it on his 1½-ton winch-equipped truck. It can be hydraulically elevated and lowered without the use of cables or telescoping arms, to suit requirements of almost any job, and when the unit is not needed, it may be laid back across the truck cab in such a position that the bed is left clear to permit normal use of the truck for hauling purposes.

A second feature that merits attention in the design of the unit is the fact that the actuating arms and hydraulic rams which operate them are located beneath the truck bed, which allows just that much more free surface area on the truck bed.

Lays Over Truck Cab

The A-frame is constructed of drill pipe, the lower approximately half of which is of four-inch and the upper portion of three-inch material. As shown in Figure 1, the two legs of the framework have offsets at two points which allow the unit to be laid back over the truck cab when not in use. Fillet plates of ½-inch steel are welded behind the pipe at each of the bends to reinforce the structure at these points. In the elevated position, the frame has an effective height of some 18 feet over the truck bed. When it is swung to its limit of travel, which is slightly past center, the eight-inch sheave at the apex of the mast comes to rest over a point approximately eight feet beyond the rear edge of the truck bed. Figure 2 shows the mast in the latter position. Likewise shown in this photograph is the manner of attaching the base of the mast legs to the horizontal shaft which extends across and just beneath the truck bed.

In order to maintain the same side clearance at the points where the legs are attached to the shaft, a rectangular cut-out some five inches deep was made in the edge of the bed. These cut-outs

Figure 3. Weight of overhanging portion of mast, when the latter is laid back over cab, falls upon rubber padded rest on edge of bed. Power oil reservoir is visible beneath edge of truck bed. Hydraulic rams are located above rear axle.

Figure 4. Winching of heavy equipment is aided with this dual-purpose sheave which rests in a socket on rear of truck bed. One side-plate of sheave is hinged for rapid engaging of wire line. Horizontal arm is placed in socket when sheave is needed for horizontal pulls to one side of truck.

reduce only slightly the total area of the bed, and still permit free movement of the legs on the shaft as they swing through their maximum arc of travel of slightly over 90 degrees.

Figure 3 illustrates the method used in supporting the A-frame arms on the side of the truck bed when the unit is laid back across the cab in the reclined position. Near the point where the first bend would normally contact the truck bed, a curved metal support, surmounted by a rubber pad, was installed. With one under each leg, these pads absorb the shock that is received when the unit comes to rest, as well as some of the truck vibrations when the vehicle is in motion. Also shown in the photograph, below the bed, is the horizontally mounted, ten-gallon reserve oil container which supplies the hydraulic system.

70-Ton Rams

A power takeoff at the front of the truck engine powers a vane-type, 3000-pound per square inch pump which supplies hydraulic power to the lifting mechanism. The latter consists of two 70-ton hydraulic rams which are mounted beneath the truck bed near a point above the truck rear axle. These rams work against the lower ends of 15-inch long arms made of heavy steel plate, the upper ends of the arms being welded to the horizontal shaft extending laterally to either side of the truck bed where they join the legs of the A-frame. With the frame in the reclined position, these arms lie at an angle of about 40 degrees from the horizontal, the leverage ratio provided being in the order of approximately 57 to 1.

Behind the power pump, which incidentally runs continuously when the engine is running, is a bypass valve set for 1000 pounds per square inch. Reserve oil is stored in a 10-gallon reservoir slung beneath the edge of the truck bed behind the cab. The ram cylinders, five inches in diameter and having a 22-inch stroke, are designed for a working pressure of 1000 pounds per square inch. A safety factor of three is provided by pressure testing all fittings and hoses to 3000 pounds per square inch.

The horizontal shafting secured to the underside of the bed is made up of two pieces of 4½-inch outside diameter pipe. It is grease-packed inside a housing of five-inch O.D. pipe. Split brass bushings, seven inches long, are pressed in at each end of the shafting. All bearings are provided with high-pressure grease fittings. The sections of pipe making up the outer housing are welded to steel brackets attached to the truck frame and bed. Footings for the rams likewise are well-braced against the truck framework.

Lifting capacity of the frame varies according to the position of the mast. When it is swung up to its limit, slightly beyond center, it will lift one ton, with the capacity increasing as the mast approaches vertical.

Many Field Uses

Field applications of this versatile, inclinable mast are numerous. Some of the more common types of work done by this company include installing electric motors on pumping jacks, setting vertical pump motors on water wells, setting power poles, and installing heavy or awkwardly-handled oilfield equipment.

One of the principal advantages of the device is the fact that the piece of equipment or machinery being installed can be assembled or laid out on the truck bed in precisely the position it will be in when it is permanently installed, after which it can be picked up and swung out over the rear of the truck and lowered in place with a minimum of last-minute shifting and jockeying for alignment. This feature is particularly desirable when other equipment at or near ground level prevents backing the truck up close to the work and where skids might otherwise have to be employed. Lifting a load up and over guard rails or interfering pieces of equipment is accomplished easily with this A-frame. While many of these advantages may be found in certain conventional boom or A-frame-equipped, trucks, the fact that this new installation will fold back in a matter of seconds to allow free, unimpaired use of the truck bed, is of considerable importance.

Extra Demountable Sheave

Set in a socket on the rear of the truck bed is a removable sheave which further aids in the handling of heavy equipment with the winch line. Somewhat unusual in design, the device may be set up in either horizontal or vertical positions, depending upon the type of work to be performed. A seven-inch sheave is mounted on a backing of one-inch steel plate, the latter shaped to slightly greater diameter than that of the sheave rims. A 3/16-inch steel plate is hinged to the other side of the sheave, the hinged feature permitting the wrapping of a line over the sheave in a manner similar to the way a snatch block is used. Two 1-foot lengths of two-inch extra-heavy pipe are welded to the device at right angles to each other. Either of these arms, depending upon which way the sheave is to be used, is set in a socket of three-inch pipe welded into the edge of the truck bed, a steel pin being run through matching holes to hold it in position. Figure 4 illustrates the device set up in the vertical position, and shows the other arm projecting out horizontally and which may be inserted in the socket when the sheave is to be used in the horizontal position. While the sheave probably will receive more use in the vertical position where it is employed in conjunction with the mast, the ability to turn it over lends itself to many other jobs, such as dragging materials from one side of the truck to the other, or shifting materials located off to one side of the truck.

Unusually good results have been obtained with this A-frame and time saved on the job is amply repaying the designing and fabrication connected with its construction.

Court Decision

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tion may know, during the term, how to make, construct, and use the invention. (3) That other inventors may know what part of the field of invention is unoccupied."

It is the last of these three "ends" which perhaps applies most directly in this case, for as the Court said specifically with respect to the Walker patent:

"This patent and the infringement proceedings brought under it illustrate the hazards of carving out an exception to the sweeping demand Congress made in Rev. Stat. 4888 (to clearly describe . . . and distinctively claim . . . his invention). Neither in the specification, the drawing, nor in the claims here under consideration, was there any indication that the patentee contemplated any specific structural alternative for the acoustical resonator or for the resonator's relationship to the other parts of the machine . . ."

"Under these circumstances the broadness, ambiguity, and overhanging threat of the functional claim of Walker becomes apparent. What he claimed in the court below and what he claims here is that his patent bars anyone from using in an oil well any device heretofore or hereinafter invented which combined with the Lehr and Wyatt (previously patented) machine performs the function of clearly and distinctly catching and recording echoes from tubing joints with regularity. Just how many different devices there are of various kinds and characters which would serve to emphasize these echoes, we do not know. . . . In this age of technological development there may be many other devices beyond our present information or indeed our imagination which will perform that function and yet fit these claims. And unless frightened from the course of experimentation by broad functional claims like these, inventive genius may evolve many more devices to accomplish the same purpose."

In short, when it comes to those relatively narrow inventions which consist in putting together new combinations of old elements, each inventor cannot extend his patent monopoly beyond that covering the particular combinations of the specific old element which he found could accomplish the result he sought, for to do so would discourage other inventors from making further improvements and in that way would tend to discourage rather than "promote the progress of science and the useful arts."

Finally, therefore, the fundamental philosophy underlying decisions such as this must be found in the answer to the question of whether the patent laws are designed to promote monopolies on minor improvements, gadgets, or mechanical skill, or whether they are intended to promote real scientific advances. The decisions of the present Supreme Court appear clearly to support the latter view, which is likewise supported by the decisions of this Court's predecessors from a very early date.

Whether or not the decision and the principles announced in the Halliburton vs. Walker case will increase or decrease the incentive for the making of inventions, time alone will determine. In the writer's opinion it will probably make for an increased number of inventions and relatively limited patents therefor, and while the economic value of an individual patent may be decreased thereby because of the narrowed limits of the monopoly afforded by it, the over-all effect should be a much wider dispersion of the benefits of patents which will probably be salutory to our free enterprise system.

Pipe Lines of the U. S.

T-G-T

Seventh of a Series

Station	Distance	Pipe Diameters and Loops
**McAllen	95.0	One 10-in.*
†Agua Dulce	90.4	One 24-in.
*Victoria	75.5	One 24-in.
East Bernard	80.7	One 24-in.
*Cleveland	77.1	One 24-in.
Jasper	81.5	One 24-in.
*Natchitoches	75.9	One 24-in.; loop 23.3 mi. of 26-in.*
Monroe	87.0	One 24-in.; loop 02.0 mi. of 26-in.*
Greenville	86.9	One 24-in.; loop 61.0 mi. of 26-in.*
Batesville	85.1	One 24-in.; two loops of 26-in., 27.9 and 25.0 mi.*
Middleton	81.9	One 24-in.; loop 45.9 mi. of 26-in.*
Lobelville	92.3	One 24-in.; two loops of 26-in., 32.1 and 27.6 mi.*
Portland	80.3	One 24-in.; loop 48.5 mi. of 26-in.*
Campbellsville	89.6	One 24-in.; loop 35.1 mi. of 26-in.*
Winchester	90.7	One 24-in.; loop 12.3 mi. of 26-in. and 9.8 mi. of 24-in.*
Huntington	85.2	One 20-in.

* Under Construction. † Dehydration plant.

Note: In addition to existing lines and lines under construction as shown on this map, Tennessee Gas and Transmission Company has applied to the Federal Power Commission for authorization to build 832.2 miles of 26-, 24- and 20-inch loop to this system.

EXISTING CONNECTIONS WITH

1. Louisville Gas & Electric
2. United Fuel Gas Company
3. Hope Natural Gas Company
4. Taylor-Green Gas Company
5. Kentucky Natural Gas Company
6. Tennessee Natural Gas Lines, Inc.

Removable Foot Bridges

SIMPLIFY LEASE CLEANUP

By ELTON STERRETT
Engineering Editor

IF A pipe line traverses an area cut by wide and deep drainage ditches in which water stands or flows during a considerable portion of the year, provision of light foot bridges for the line-walker and maintenance crews will speed up their work and reduce the accident hazard present if improvised crossings such as a log or single plank must be used.

One producing company makes up a standardized bridge unit which may be used as a single span for the usual drainage ditch, or combined in sets of two or more with pipe piers to cross extended flooded areas.

The unit consists of two 20-foot lengths of 2½-inch extra heavy pipe, spaced on 26-inch centers and tied together with 28-inch long pieces of ¾-inch sucker rod on approximately three-foot centers. The ties are all placed on what will be the under side of the span, and welding done on a flat surface to insure even placing and accurate alignment of the two pipe members. On the top of the pipes are welded the hand rail standards, formed from scrap sucker rod and extending 42 inches from the pipe. The rail is made continuous, terminating one inch short of the end of the 2½-inch pipe.

Figure 1. Self-supporting, this foot bridge spans the average drainage ditch and is readily removable if the ditch must be dredged out or if trash or waste oil is to be burned.

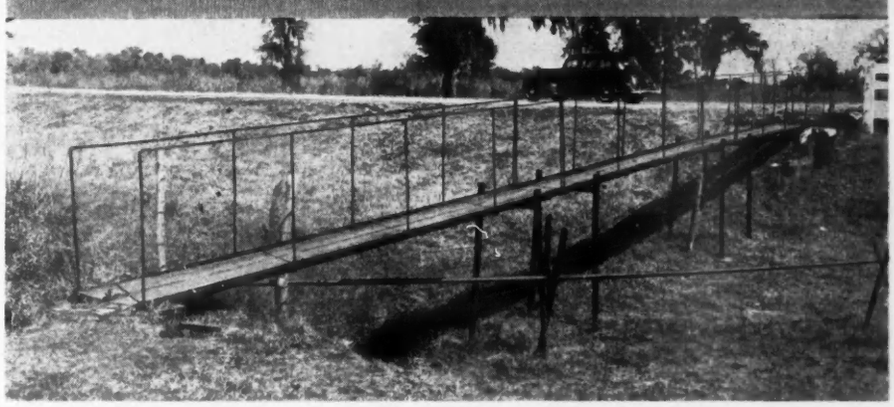


Figure 2. Intermediate piers of pipe, driven into the ground or set in concrete, support the ends of abutting spans and enable the bridge to provide safe and dry walkway over considerable areas.

End Stoppers

When used as a single span, end "stoppers," consisting of a 28-inch section of 2½-inch pipe with two 8-inch nipples of 2-inch pipe welded to it so as to fit into the open ends of the pipes forming the base of the span, are placed so as to prevent dirt and water from entering the unit, and to afford a bearing surface which will support the unit.

After the span has been swung across the ditch by the winch truck, the flooring is put in place. This consists of two 2x10's, laid between the pipes which serve as girders. To prevent shifting of the timbers they are held in place by two ties of the same material, placed under the boards and extending out under the pipes. When spiked in place, they effectively hold the planks against shifting or removal.

Constructed

If the gap to be bridged cannot be spanned by a single unit, pipe piers are constructed to serve as intermediate supports. They are formed by driving 2½-inch pipe into the ground—if the holding be ample—and welding cross pieces between the pairs to support the ends of the prefabricated spans. The bents are placed in pairs, so that each span of the bridge is individually supported.

The stoppers are used only at the ends where such a bridge contacts the ground. Sixteen-inch pieces of 2-inch pipe are slipped into the open ends of the girder pipes to hold them in alignment as the bridge is assembled. To prevent telescoping of the alignment piece entirely within one joint of pipe, matching holes are drilled or burned through girder and pin member so that a 20-penny nail may be dropped into place to retain the tie so it will rest one half in each pipe.

The single-span bridge may be lifted and swung aside with the winch truck when it becomes necessary to re-dig the ditch or if it fills with trash or waste oil which must be burned. The longer unit may also be dismantled with little effort if it must be put into the clear for any reason. The job is done by blocking up on the pier nearest one end, lifting the ground end of the span clear, and dragging it endwise until the alignment pins are freed. The span then is handled as is the single unit.

Erection Aid

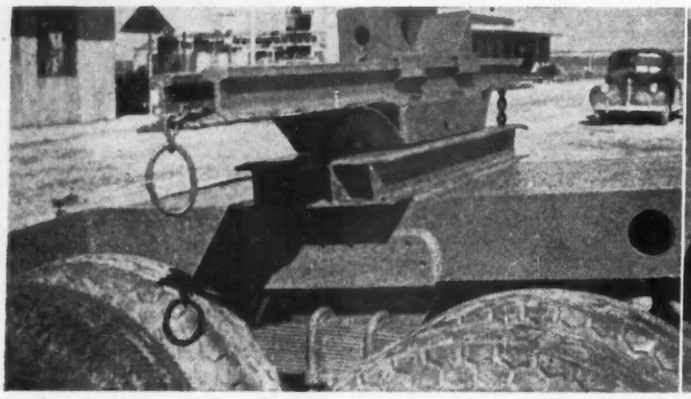
For ease in erection, the piers are so laid out that the cross-members carrying the spans are still supporting the girders when the alignment pins have cleared the ends of the girder pipes.

The handrail is stiffened if the gaps at the ends of sections are bridged by short sections of the same diameter rod, welded into place to present an unbroken surface. It is, of course, necessary to cut these ties if a bridge is to be dismantled or moved.

Since 2½-inch pipe is used, and the supporting cross members are aligned with the bottom of the plank, the upper side of the two base pieces extends above the tops of the walkway timbers, and thus forms an effective toe-board and insures against lost footing when the boards are wet, or mud- or oil-covered.

Planking and pipe construction used are heavy enough to support two men in the center of a span without permanent deflection, or to take the weight of a cow which may venture on the bridge and can pass the clearance of the handrails. Proof that the bridges are sometimes used by cattle is removed by the line-walker before it can set up a local site favoring rotting of the plank and corrosion of adjacent pipe and cross members.

Practical, Heavy-Duty Trailer Beds Easily Fabricated in Shop



There are many instances when commercially-made trailers do not exactly suit the requirements of the transportation department of drilling companies. When the case arises that specially designed truck beds be fabricated, usually the job can be performed right in the company machine shop by a welder from excess pieces of steel and iron.

MOVING EQUIPMENT

Two practical designs for heavy-duty trailer beds suitable for moving heavy, oil field equipment are illustrated above. The construction in each case is relatively simple, yet extremely sturdy; each serving its particular purpose. The material involved in the construction of both suggestions is standard stock steel, but for the most part, it is salvaged metal goods which may be found in scrap piles around the average machine shop.

The design on the left incorporates two eight-foot sections of discarded rail bars welded side by side with a seam joining the two bases as shown. These sections are then welded to a heavy bed plate to which is welded a vertical pin. This pin allows the rail sections to rotate about the pin which rests inside a vertical bushing mounted in the four reinforced I-beams. These I-beams have been welded together, edge-to-edge as shown, and welded to the heavy plate steel bed at a point directly above the midpoint between the dual axles.

Two chocks are made from plate steel to the form of wedges. The bottom edges of each chock has a retaining lip which slides along under the lip of the rail bar. This lip prevents the chocks from becoming misplaced as well as to keep it in place when either pipe or other equipment is so braced. A handy piece of chain is tacked to each chock to make it possible for the operator to handle the chocks without having to reach over the truck bed.

Similar results were obtained by one drilling contractor who used salvaged four-inch pipe as the cross members which formed the bed of the trailer. In this case, illustrated at right, three eight-foot sections of four-inch pipe were mounted on the trailer frame as shown and welded in place. The forward two lengths of four-inch pipe were welded approximately 12 inches apart, with a strip of ⅜-inch strap steel welded to the inboard sides of the two pipes. These two straps function only to hold the two chocks in place during moving operations. Both chocks, fabricated from steel, were held in the track by small metal flanges which were welded to the bottom with sufficient slack to permit their free travel along the track. This simple arrangement permits a solid trailer, but is still flexible and may be used to carry tubular goods or to haul heavy equipment mounted on skids.

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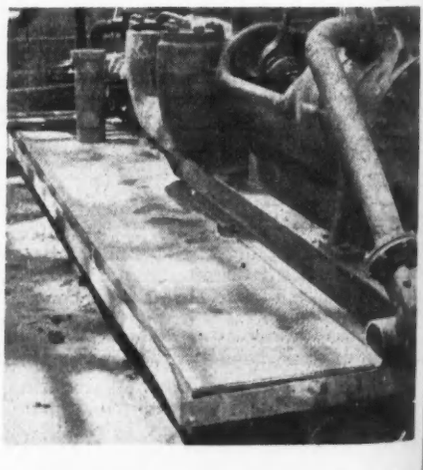
PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

Pump Skid Side-Boards Drain Off Excess Fluids

A large percentage of the water and mud that makes up the run-off from a pump battery can easily be collected and drained off wherever desired by following the system devised by one drilling company. Surrounding the elevated steel deck making up the floor beneath the pump is a narrow trough made by securing a strip of steel sheeting to the edge of the flooring unit. Water and mud draining from the equipment will run over into the trough regardless of which way the platform may be tilted when installed, and it then may be drained off in any manner convenient to the particular installation.

SAFE PRACTICES

By controlling draining-off it lessens the possibility of workmen slipping and falling, and eliminates much undesirable mud conditions that usually exist around such installations.



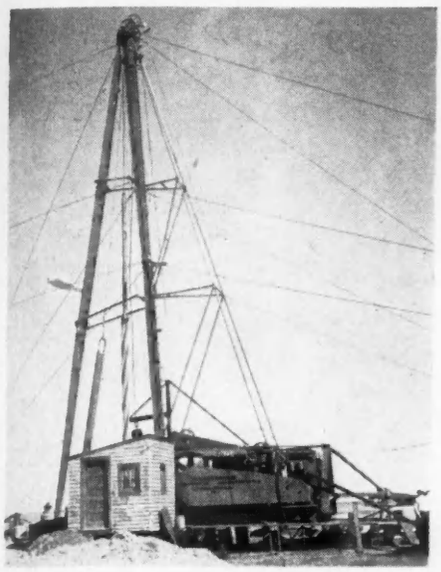
NEW EQUIPMENT LITERATURE

FOR ADDITIONAL INFORMATION, USE MAILING CARD INSERTED OPPOSITE THIS PAGE

1—Mobile Spudder

An all-steel spudder that drills to 6000 feet and handles a wide range of servicing operations to 7000 feet is now available.

The 48-L retains the mobility characteristics which feature the smaller 36-L, 28-L and 24-L machines.



Up to 5000 pounds of tools can be swung on the 60-foot derrick, an all-steel cantilever-braced telescoping box structure which is power raised and extended by a built-in winch. Erecting the derrick requires only an hour, the manufacturer reports. For handling exceptionally heavy casing loads, an extra casing tackle arrangement gives the 48-L derrick capacity for handling up to 120,000 pounds static load.

A four-reel machine, the 48-L has spooling capacity of 12,000 feet of 7/8-inch drill line and 12,200 feet of 9/16-inch sand line without divider. The calf reel spools 1390 feet of 7/8-inch casing line and the calf reel storage drum spools an additional 1200 feet. The bull reel and sand reel are equipped with non-chafing dividers. Fast line speeds and powerful line pulls are performance features of the drums, which provide two forward speeds and one reverse on four reels. Accurate positive braking is provided on all drums by friction brakes augmented by a hydromatic braking arrangement.

Automatic spooling of the drilling line is provided by the oscillating heel shaft and the spudding beam sheave, which is mounted on a swiveled bracket to prevent excessive offleads. Deflecting sheaves for the sand line and casing line make spooling of these lines automatic also. Operation of the machines is controlled from the drilling end of the machine, where all levers are conveniently grouped.

Bucyrus-Erie Company, South Milwaukee, Wis.

(Check item 1 on postcard for more information.)

2—Drill Pipe Wiper

A new, all-purpose drill pipe wiper is said to produce unusual results. Made in two outside dimensions . . . 17 inches outside diameter and 14 inches outside . . . the drill pipe wiper is bowl-shaped and molded of wear-resistant rubber. It contains no metal parts, which the manufacturers claim eliminates the "sparking" hazard and prevents the wiper from becoming torn up. Four drainage ports have been moulded in the bottom of the bowl, whereby the overflow fluids are caught and delivered back into the hole. These holes are manufactured with a thin layer of rubber covering the top, making it possible for the user to leave the bowl solid or to break through the thin covering to form the drainage ports.

The new drill pipe wiper is available in the following sizes: 2 3/8, 2 7/8, 3 1/2, 4 1/2, and 5-9/16-inch pipe size. According to the manufacturer, these wipers are guaranteed.

Weatherford Spring Company, Weatherford, Texas.

(Check item 2 on postcard for more information.)

3—Tubing Ripper

A new tubing ripper for oil field service is of the drive-down type, and is designed to be run in the tubing on a line with wire rope socket, sinkers and jars. It is simple in design and is said to be positive in operation, having only two moving parts.

The body of the ripper is of one-piece construction, being slotted on one side to take the cutting bar and tension spring. A trip lock completes the assembly. The ripper is run to the desired depth in the tubing and is set by hooking the trip lock over the end of the cutter bar. The cutter bar is then unsheathed by slowly pulling upwards on the wire line. The end of the trip lock is designed to catch in the collar between the tubing joints, pulling it away from the cutter bar. The tension spring then forces the cutter bar into position for ripping.

Larkin & Company, Butler, Penn.

(Check item 3 on postcard for more information.)

4—Traveling Block

Designed to do a "man-sized job" is this new 60-inch traveling block. Made in two capacities, the block with four sheaves will handle up to 200 tons, while the five-sheave block will carry 250 tons. Though rated as a 60-inch traveling block, the actual overall dimensions are much greater, as indicated by the man standing alongside.

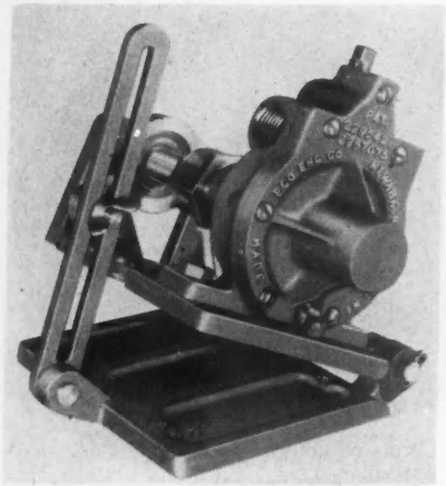
Several outstanding features are claimed by the manufacturers, and include (1) streamlined construction for balance to provide straight fall and safety; (2) sturdy and compact to assure maximum derrick working space; (3) large diameter center pin to assure longer bearing life; (4) heat-treated sheaves with standard API grooves; and (5) Hy-load roller bearings with alemite lubrication. These blocks can be furnished with an adapter which can be connected to the drilling hook by a short, rigid coupling.

McKissick Products Corporation, Box 2496, Tulsa.

(Check item 4 on postcard for more information.)

5—Tilting Pump Base

The new ECO tilting pump base is especially suitable where it is necessary to engage and disengage the pump. Made of bronze throughout, it incorporates a double-sealed, grease-packed



outboard shaft bearing which is said to retain its lubricant indefinitely, and assures reduced wear on the moving parts of the pump by providing increased stability.

A convenient method of tightening a slack belt is also provided by the tilting pump base, which will hold the pump at any angle up to 45 degrees from the horizontal by means of a wing nut. The new tilting pump base will accommodate all ½-inch and one-inch single and double impeller ECO gearless pumps.

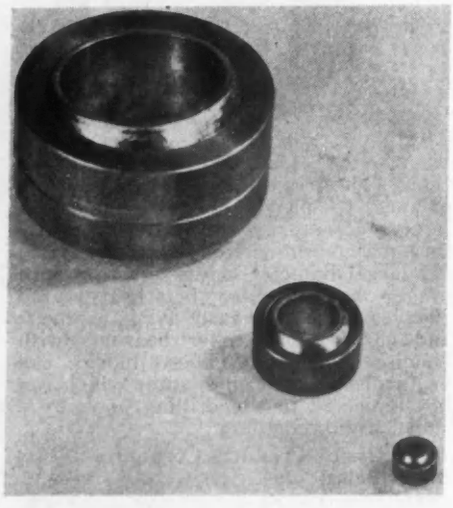
ECO Engineering Company, 104 New York Avenue, Newark 1, N. J.

(Check item 5 on postcard for more information.)

6—Bearing Assemblies

Improved production methods now make Monoball two-piece bearing assemblies available in larger quantities to manufacturers of equipment or engines using misalignment bearings or rod ends with misalignment bearings installed.

Numerous applications for the bearings include: installations with oscillating rods and tubes of low revolutions per minute; where lubrication by oil or grease is not possible; and where alignment is expensive to attain or where rigidity is desired.



The ball, which is hard-chrome plated, is completely enclosed by the one-piece race. Race materials are high strength bronze, steel or stainless steel. Bore sizes range from 3/16 to three inches and accommodate ultimate loads from 7000 to 500,000 pounds.

Rod end bearings are available in similar size range with externally or internally threaded shanks or plain for butt welding.

Southwest Products Company, 10 So. Catalina Avenue, Pasadena, Calif.

(Check item 6 on postcard for more information.)

7—Portable Drilling Rig

A new drill and water well rig featuring a heavy-duty rotary and other improvements is now being manufactured. The new drill, designated as Model No. 2, is rated for 500-foot drilling with a 4 x 5-inch mud pump and for 1000-foot drilling with a 4½ x 6-inch pump.

Model No. 2 drill has a 25-foot mast which is raised and lowered by a hydraulic cylinder. Pull-down is provided through two continuous one-inch chains, which also pick up the rod while drilling. They travel close to the mast and do not interfere with any operation around the rotary. Brakes are of the internal expanding type and will safely

handle drill rod at the recommended drilling depths. All bearings are self-aligning, ball and roller, and chains and sprockets in the main gear case operate in an oil bath. The draw works is an independent unit.

An extra heavy-duty rotary is equipped with Timken bearings which run in an oil bath. The five-inch opening through the rotary will permit passage of all tools necessary for coring operations. Three speeds forward and one reverse provide ample selection of rotary speeds to meet all conditions of drilling.

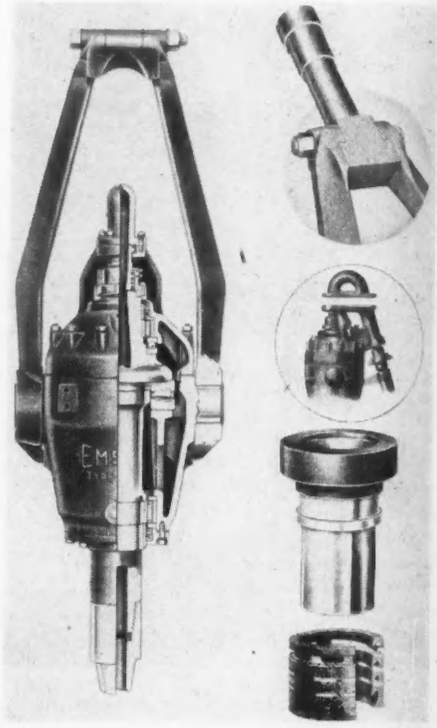
The design of the new drill is said to provide more usable working space around the rotary. All controls are hand operated and are within easy reach of the driller. A rat-hole with fluid drain is placed above the rotary; the lower end of the kelly joint may be placed in it while connections are being made. During this operation, mud will not drain onto the rotary and control levers. Makeup and breakout posts for pipe wrenches simplify and expedite the job of making connections. Model No. 2 drills will be mounted to specifications on purchaser's truck.

Carey's Machine Company, 1702 Roberts Street, Houston.

(Check item 7 on postcard for more information.)

8—Oil Field Swivel

The manufacture of a new series of oil field swivels designed for medium and deep drilling was announced recently. These swivels, designated as the JV series, are said to incorporate field-



proven and time-tested design features plus numerous improvements developed through research and experience. Types available are JV-7, JV-8, and JV-9.

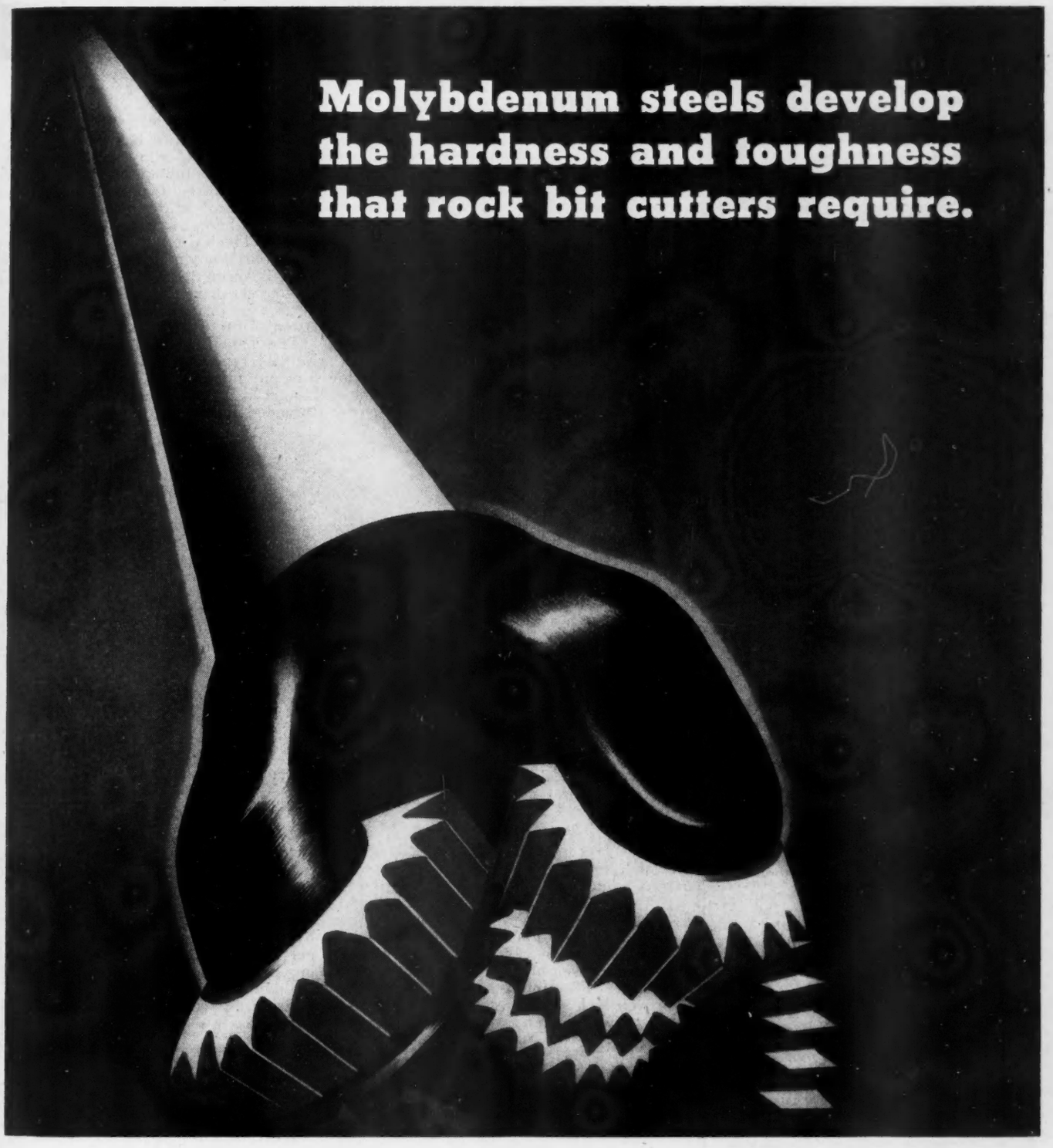
All Series JV swivels have the new demountable steel bail. This bail can be readily converted from the conventional or hook type to that using the elevator shank. The tapered design of the bail arms distributes load stresses equally, the manufacturer states. The bail arms are easily removed to facilitate field repair and assembly. A conventional, one-piece, forged-steel bail is also available as optional equipment is desired.

The fluid channel through the wash pipe and sleeve assembly is designed to afford a venturi-type passageway. This feature is said to increase considerably the life of wash pipe packing by inducing a high-velocity, low-pressure area adjacent to the packing.

A special factory-assembled cartridge-style packing has been developed for use with the JV Series swivels. This new packing is so designed that the sealing lip of each ring acts free and independently from the others, thus, all pressure is absorbed by the solid outer portion of the ring rather than compressing the entire packing. Being factory assembled in cartridge form and designed to prevent improper installation, this packing is said to eliminate replacement difficulties.

EMSCO Derrick & Equipment Company, P. O. Box 2098, Terminal Annex, Los Angeles 54.

(Check item 8 on postcard for more information.)



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By FREDERICK H. LAHEE

Chief Geologist of the Sun Oil Company. Formerly Assistant Professor of Geology, Massachusetts Institute of Technology

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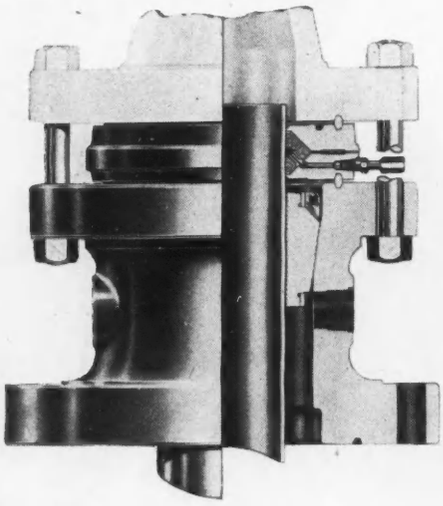
NEW EQUIPMENT . . . LITERATURE

9—Forged Steel Well Heads

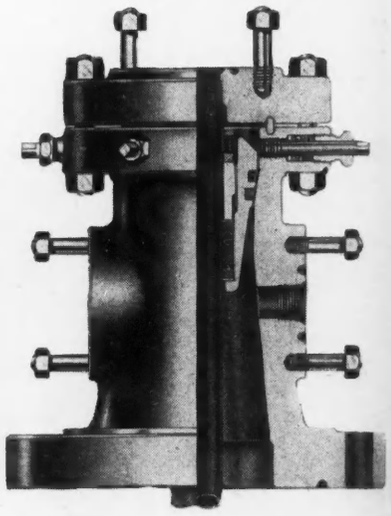
Made possible by the installation of a new 5000-ton forge press is a complete new line of forged steel well head equipment. In the Type "F" casingheads and casing spools is presented a new series of well head equipment for low and intermediate pressure service. One of the unique features of this series is the casing seal, which is provided in a separate flange assembly which fits between standard API flanges. As the flange studs are tightened, compressive force is transmitted through the flange assembly to the triangular shaped seal ring to force it into sealing engagement with the pipe. The seal ring is a special composition of asbestos bonded with oil resistant Hycar rubber. The seal flange is available with or without a pressure test port as desired.



The forged steel slips, in six segments, provide dependable suspension for the casing string. The segments are contained in a split cage so that they may be easily assembled around the casing.

Type "F" tubing head employs the proven lock screw design which permits the tubing hanger assembly to be firmly locked and sealed on the tapered hanger seat by means of alloy steel set screws. Three types of tubing hangers are interchangeable in the Type "F" tubing head, allowing the operator to select the type best suited for his particular well completion. The Type "FS" hanger, which is commonly known as the "polished joint" type, is recommended where it is desirable to wash in the well and set a production or formation packer by manipulation of the Christmas tree.

The Type "FB-A" hanger is the "boll weevil" type and may be run through blowout preventers. The Type "FB-B" hanger is a "boll weevil" type which is threaded inside to receive a back-pressure valve. The back-pressure valve allows the operator to safely wash in the well under blowout preventer control. After the tree is installed the back-pressure valve is removed from the hanger by means of a valve removal tool. Stripper rubbers are available for these tubing heads and readily interchange with the above hangers.



Cameron Iron Works, Houston.

(Check item 9 on postcard for more information.)

Literature

10—Wire Line Manual

A manual and catalog on the uses and selection of wire lines for the oil country has been published. Only 4¼ by 7¼ inches in size and printed in two colors, about one-third of the manual is devoted to fundamental engineering data on wire ropes and general principles governing their uses and selection.

Included is a section in which various oil country wire line applications are discussed. Recommendations are given for wire lines used in rotary drilling rigs, cable tool drilling, production and refinery operations. Information on wire line fittings, terminals and on slings is also presented.

At the end of the manual is a group of wire line selection tables, prepared to simplify the choosing of correct lines for various purposes. The entire booklet is indexed for rapid reference.

Rochester Ropes, Culpeper, Va.

(Check item 10 on postcard for more information.)

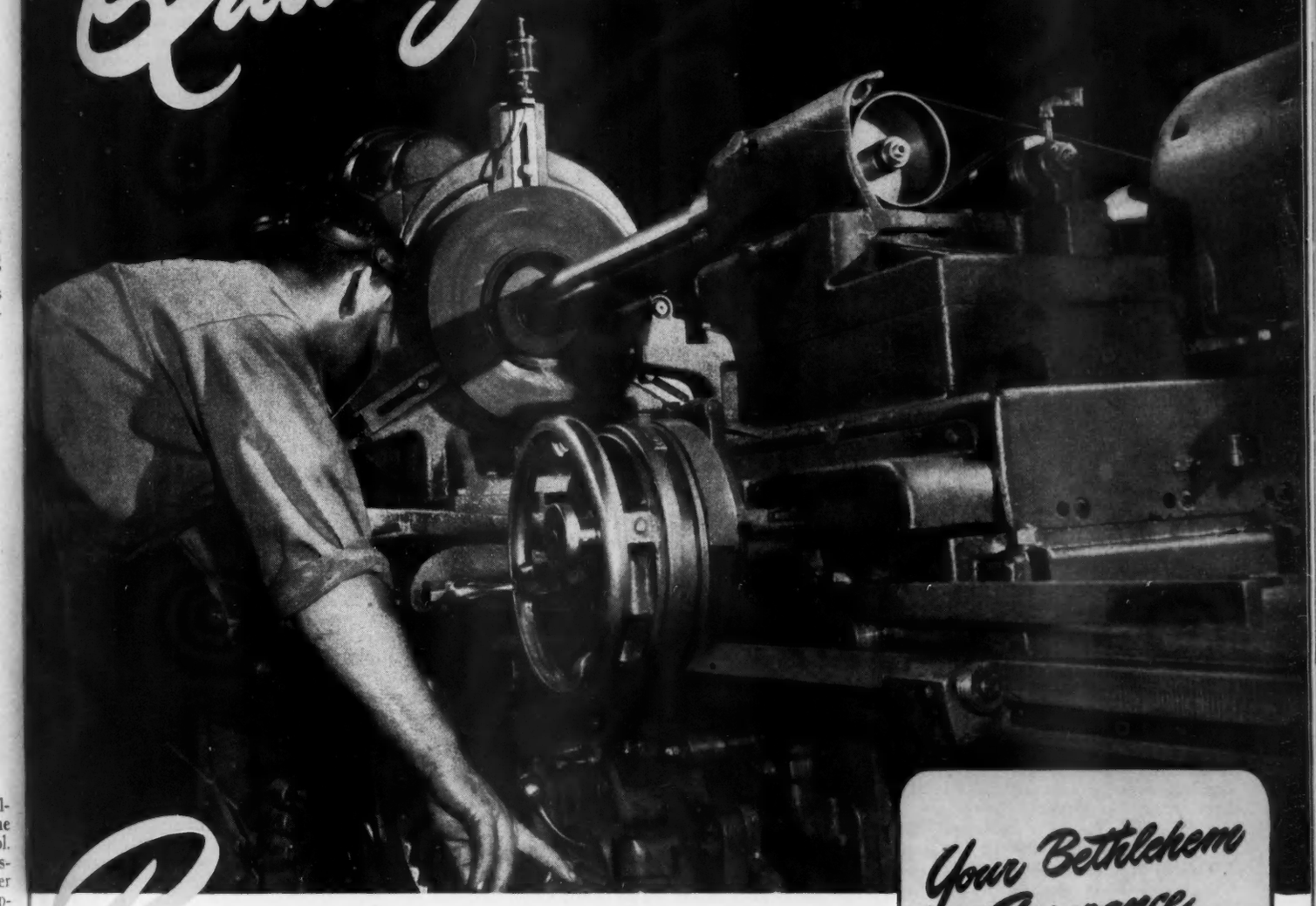
11—Flexible Couplings

The latest engineering catalog on flexible couplings contains 58 pages of specifications and descriptions, including illustrations on a complete line of standard flexible couplings. Designed for an extended range of applications, the couplings described are shown in cross section by engineering drawings. The specifications given in each type contain the size number, maximum bore, maximum revolutions, service factors and recommended type of service in each cast. Misalignment and float capacities are given for special applications.

Thomas Flexible Coupling Company, Warren, Penn.

(Check item 11 on postcard for more information.)

Quality MARKS THE THOROUGHBRED



Precision: *Grinding of Bethlehem Flint-Hard Liners*

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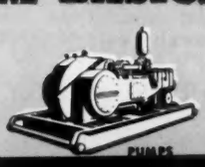
BETHLEHEM BASICALLY-BALANCED DRILLING EQUIPMENT

TABLES


PUMPS

CROWN BLOCKS

TRAVELING BLOCKS

75th Anniversary AIME Meet

Broader program including world mineral papers includes various petroleum topics

By L. J. LOGAN
Associate Editor

A BROADER program than usual was followed this year when the American Institute of Mining and Metallurgical Engineers held its annual meeting in New York last week. It was the 75th anniversary meeting for the Institute, and in advance of the customary program of technical and economic papers, there was a three-day World Conference on Mineral Resources, during which the increased importance of minerals in the world economy and world affairs was recognized. Participated in by prominent industrialists and other men of numerous other countries as well as the United States, the sessions lasted throughout the entire week.

The petroleum industry was well represented. Several of the papers presented at the World Conference on Mineral Resources were devoted to petroleum problems, in addition to the papers scheduled at the customary regular sessions of the petroleum division of the Institute.

Some of the technical and economic papers on the petroleum division's program were available for abstracting in THE OIL WEEKLY of March 17, beginning on page 50. In this coverage of the sessions, there are summaries of additional papers which were available soon enough in advance of press time, most of these having been presented at the World Conference on Mineral Resources.

1970 Demand

Use of liquid fuels in the United States will continue to expand, and consumption of 1970 will be 56 percent above 1945, but the petroleum industry will be able to supply the growing requirements, under proper governmental environment, in the opinion of Robert E. Wilson, chairman of the board of Standard Oil Company (Indiana), and J. K. Roberts, general manager of research for the same company. Title of their paper was "Petroleum and Natural Gas—Uses and Possible Replacements." Under their forecast, there would be a demand in 1970 for 2600 million barrels of crude oil or its equivalent.

This forecast allows for expected material increases in consumption of gasoline, diesel oil, and heating oil. Automobiles are expected to increase in number and to use slightly more gasoline per car per year, with benefit of better roads. Commercial vehicles will increase in number at even faster rate, and use per vehicle will increase 30 percent by 1970. Diesel equipment will be used more widely, especially on railroads and seagoing vessels. Use of oil heaters for homes is expected to double by 1950, and to treble by 1970, when 20 percent of one- and two-family homes in areas using central heat will be oil-heated. Quality of petroleum products will be further improved, involving especially higher octane gasoline generally, and expensive processing will be necessary. Such developments as the jet engine, gas turbine, and atomic power are not expected to change the favored position of petroleum and natural gas in supplying fuel needs.

To meet the vast future requirements for liquid fuels, the petroleum industry probably will have to make various readjustments and broaden its activities to some extent into synthetic processes, the authors concede. They accept as a fact an increased difficulty in finding new oil reserves, following past discovery of the shallower and more easily found fields. Oil discovered per wildcat drilled is now only half the amount of 10 years ago. Cost of finding new reserves is six times greater than a decade ago, due to higher drilling costs, greater depths, and reduced accessibility of location.

Regulate Imports

Because of growing consumption and difficulty of oil finding, the authors expect exports to decrease and imports to increase. They asserted, however, that imports should be regulated so as not to discourage search for new reserves or development of substitute fuels. Most promising of synthetic processes is that of making gasoline and other liquid fuels from natural gas, two 6000-barrels per day plants of this type being now under construction at Brownsville, Texas, and in the Hugoton gas field of Kansas. Known natural gas reserves if used wholly for this purpose would supply gasoline needs for about 12 years. For an additional 3 to 4 cents a gallon, gasoline can be made from coal by a modification of the same process (Fischer-Tropsch) and U. S. coal reserves are adequate for a thousand years. Gasoline from coal likely will precede gasoline from oil shale or tar sands and is expected to become a factor by 1970 but could come sooner under less costly processes such as underground gasification of coal. Fuels from farm products are too costly for serious consideration.

The petroleum industry has brought down prices of its products much more than most industries, the authors showed, but has been able to do so only by exceptionally heavy capital expenditures, while future advances will require still more expensive equipment. Therefore, the industry can effectively meet its responsibilities only if government permits adequate return on necessary investment.

International Problem

Unlike the development of coal and some other natural resources, which often can be handled by a nation independently of other countries, petroleum development involves serious international problems and must be highly integrated internationally, declared Sir William Fraser, chairman, Anglo-Iranian Oil Company, Limited, speaking on "International Aspects of the Petroleum Industry of the Future." This is true, he explained, because of the extreme disequilibrium in national resources of petroleum, with some regions rich in reserves and others having virtually none.

Three whole continental areas, Africa, Australia and Europe, are very poor in petroleum reserves or possibilities, he stated, and they are quite likely to remain dependent on the others, including North and South America and Asia, where nature has been more bountiful in providing oil.

In his address, Sir William took an optimistic view of the problem of meeting growing world needs for petroleum from known reserves and reserves likely to be discovered. In this connection, he took the view that it still is too early to give a great deal of serious thought to the possibility of being forced to resort to such secondary oil sources as coal or shale for necessary oil supplies. Recalling his own early oil experience in the Scottish shale industry, he declared that human effort and costs in winning oil from solid mineral deposits are prejudicially high. "I cannot foresee these so-called second-line resources ever succeeding free petroleum without material detriment to national economy, unless there be a complete revolution in current production technique."

Sir William's confidence in the continuance of natural petroleum as the predominant source of oil did not overlook the magnitude of present and prospective requirements. Consumption doubled every ten years from 1880 to 1930, he stated, and it again doubled in spite of depression and war in the 15 years from 1930 to 1945. Yet plans must be made for continuing increase, especially in view of a growing tendency for oil to replace coal in many of its uses.

Concerning controversy over whether the U. S. should be taking steps to meet possible insufficiency of domestic petroleum reserves, Sir William said, "it does appear that the outlook is sufficiently obscure to occasion understandable anxiety in the minds of competent judges. Active exploration, on a scale and with a drive distinguished by great technical ingenuity, has proved and will surely continue to prove new areas from year to year; but concern for the future is naturally also influenced by the rising standard of consumption. So, surely, it would be idle to question the prudence of a policy aimed at safeguarding this uncertain future by recourse to external sources of supply."

Krug Lauds Industry

Good insurance of supply for the U. S. is provided by great proved and prospective reserves in South America, where large surplus over home demand is available for export, said the speaker, and "I think we must assume that the tendency will be for this surplus to be more and more attracted to the United States and less and less to more distant and less well-placed consumers."

In delivering the first paper on the program for the World Conference of Minerals Resources, Secretary of Interior Julius A. Krug spoke on "Mineral Resources of the United States." Promotion of a healthy domestic mining industry is the basic policy of his department, he said, and the greatest service it can perform for the mineral industry is to continue its fact-finding and research functions. The department feels a responsibility for doing real service to private mineral industry, he stated, but at the same time fully realizes that the greater part of meeting the nation's min-

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eral needs must be done by industry itself, working in a free economy.

The petroleum and gas industries were implicitly given high commendation by Secretary Krug for having taken the initiative among all mineral industries in making periodic surveys of the mineral reserves of the nation. He recommended that other industries periodically assemble data determining the known or proved national reserves of their respective commodities and make these data available in a manner similar to the practice of the American Petroleum Institute and the American Gas Association.

Discussing the nation's position regarding adequacy or inadequacy of resources of the various minerals, Secretary Krug classified them into three groups: (1) those that are available in abundance; (2) those that are entirely lacking; and (3) those that have been abundant but now are becoming depleted. Petroleum might be included in the third group, he said, along with copper, lead, zinc, silver, gold, etc. Reserves of numerous minerals are critically low, he declared, because of heavy wartime use and handicaps in discovery of new reserves, but it remains to be seen whether or not this condition will be permanent, and the problem should be alleviated by more intensive and extensive search for new reserves and by effort to improve producing and refining techniques.

Techniques of Exploitation

Petroleum exploration, production, and refining were allocated considerable attention in the discussion of "Techniques of Mineral Exploitation of the Future," by Louis S. Cates, president of the AIME and head of Phelps Dodge Corporation. Co-author of the paper was Howland Bancroft, mining consultant. The authors gave high credit for oil discovery to geophysical methods. "It is not mere coincidence that during the 15 years following the first application of geophysics the solid foundation of the present domestic oil reserves was built," they stated. However, they said, "During the past five years the expenditure for geophysical work in the United States has doubled, while results have barely equaled the average for the past 20 years."

Drilling, testing and completing techniques also share importantly with geology and geophysics in the credit for the discoveries that have met our needs in the past years, they added. The story of petroleum exploitation has been one of steady improvement of method, materials, and equipment, it was said in summary, but the limits to which engineering may be applied to exploitation with resulting improvement in recovery and lowering of cost have not been approached.

Atomic Energy Discussed

Possibilities of atomic energy as competition for oil, gas, coal, and other fuels received consideration in the discussion of the "Application of Atomic Energy to Industry," by H. A. Winne and B. R. Prentice of the General Electric Company.

As now foreseen, fissionable materials will not be usable directly as a source of electrical or other power. The power of the atom will be captured first in the form of heat and this heat will be picked up by gas or liquid transfer agents, carried through pipes and used to turn water into steam, which will then be employed in the conventional way, moving a steam turbine which will drive an electric generator. Unknown technical and economic factors prevent any accurate forecast of where, when, or if atomic power will compete with other fuels, said the authors, but the long-term future prospects for competitive and economic atomic power are bright. Since an atomic power plant would require essentially the same equipment as present plants from the steam turbine stage on, the difference in costs will be largely that between atomic type fuel use and conventional fuel utilization. And since fuel is only 20 percent of the cost of electric power, potential savings through atomic fuel are correspondingly limited.

The authors, in discussing possible applications of atomic power plants, said they would not be practical in light portable units, as for automobiles, because of the heavy protective shielding required for safety. Atomic power on inhabited aircraft is extremely unlikely for a very long time, in their opinion. It may ultimately prove possible to design an atomic plant for a locomotive, but this does not look feasible now. However, atomic plants for naval and large commercial ocean vessels look definitely possible, and attractive from the standpoint of making refueling extremely infrequent. This may well be the first real commercial application, they stated. Atomic power plants for land use are certainly technically feasible, they continued, and probably will be attractive first where fuel is scarce and high in cost.

While atomic energy offers these possibilities as a source of power, it also has perhaps equally as important possibilities for industrial uses, tracer chemistry, radiation chemistry, and other applications, the paper brought out.

The future holds great promise for an expanding market for petroleum fuels as against coal, with most factors working to the advantage of oil, concluded A. J. McIntosh, economist, Socony-Vacuum Oil Company, in a paper on "Competitive Fuel Prices," presented at the petroleum division sessions.

Oil's Price Advantage

Changes in oil prices have been so moderate over the last two decades as compared with coal, he said, that they have gained great price advantage over anthracite for home heating and have narrowed the advantage that bituminous coal has over oil in areas where that fuel is used for home heating.

Oil has a very distinct advantage over manufactured gas, but this is not the case where natural gas is available, McIntosh said. One of the reasons that oil has a ready market to home users in the natural gas supply areas is that natural gas cannot always be counted upon during extremely cold weather. In many sections no new users of gas are permitted to enter the market because of this same general condition.

Especially significant is the tremendous price advantage gained by heating oil over the past six years as compared with anthracite coal. While anthracite prices at retail have increased 43 percent since 1940, the comparable increase for No. 2 heating oil was only 20 percent. In 1946 users of distillate fuel oil had an advantage over anthracite use equivalent to more than one half cent a gallon on the oil consumed. Following the increases in coal costs in recent years, home heating unquestionably can now be done cheaper by oil than by anthracite coal. In the future, therefore, the demand for oil burners for homes may be expected to be great, and the anthracite industry will share less than formerly in the market provided by new homes, while it also may lose some of the present users.

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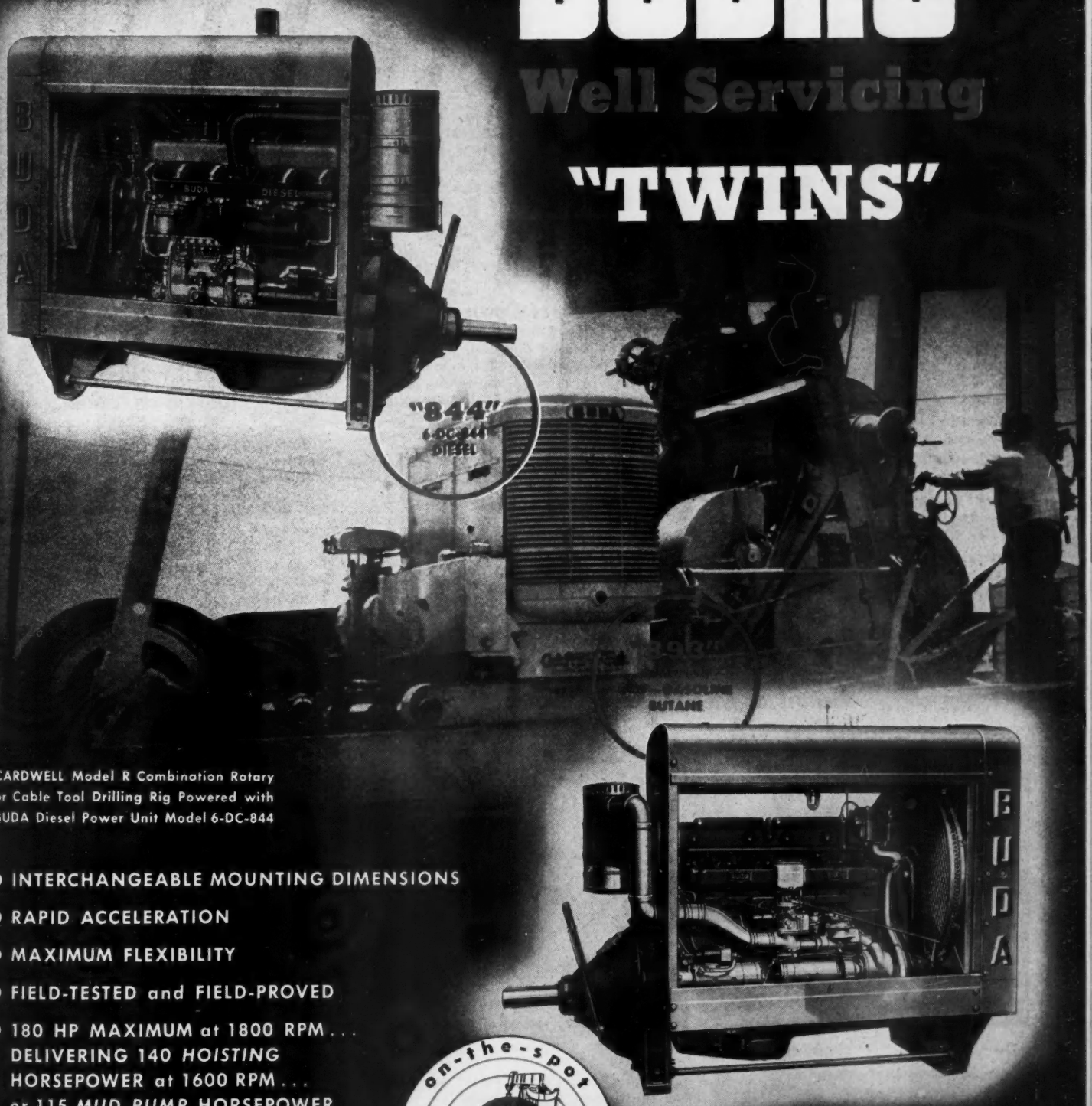

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Syria Asks Better Pipe Line Contract

The offer of a contract for laying a pipe line across Syrian territory by Trans-Arabian Pipe Line Company has been rejected by the Syrian government, according to cabled advices from Henry Ozanne, THE OIL WEEKLY's editorial representative in the Middle East.

Ozanne reported that a conference between Trans-Arabian and government officials at Damascus had collapsed and that Syrian Public Works Minister Atssi said the company must reform terms if the parley is to be reopened.

The company's rejected offer is reported to have included, annual payment of 25,000 pounds sterling (approximately $100,000) to Syria; payment of about six mills per ton on all transit oil; company exemption from customs and other charges on material and equipment imported; Syria to assume protection of the pipe line for the 600 kilometer (about 360 miles) route through Syria; all foreign agents of the company to circulate freely without passport visas in Syria, and the company to have the right to install radio stations along the line.

The Trans-Arabian line is to be constructed to carry crude from fields operated by its parent company — Arabian American Oil Company—in Saudi Arabia to a Mediterranean port. The offer of a contract to Syria indicates that Trans-Arabian plans to terminate the line in the Lebanon rather than Palestine. Ozanne reported that Syria action had stirred a protest from the Lebanon parliament.

Burt E. Hull of Houston, Trans-Arabian president, is in the Middle East surveying possible routes of the proposed 30-inch carrier.

Report Denied

Current rumors that Richmond Petroleum Company, subsidiary of Standard Oil Company of California, was withdrawing from Colombia are unfounded, a spokesman for the company told THE OIL WEEKLY last week.

The rumor, which was heard in the United States recently, is believed to have originated in Brazil.

Bolivia Output Down

Crude oil production in Bolivia during 1946 totaled 346,109 barrels compared with 1945's 406,114 barrels.

Three producing wells were completed in Bolivian fields during 1946—two at Sanandita and one at Camiri. At the end of 1946, seven rigs were operating at Camiri, three at Sanandita and one at Bermejo.

French Visitor

Robert Mangin, chief equipment engineer of Regie Autonome Des Petroles, Saint Gaudens, France, is making an extended trip through the United States studying oil country equipment. Following a week in Houston, Mangin will make a swing through the Mid-Continent, then to California. He plans to return to France about May 1.

Venezuela Oil Production For 1946 Shows Increase

Venezuela in 1946 showed a crude oil production increase of 20 per cent over 1945 at 388 million barrels, the Department of Commerce has reported.

Daily average production rose from 979,094 barrels in January to a high of 1,120,051 barrels in November, but declined to 1,089,298 barrels during December when some wells were shut down because of the lack of markets. The petroleum producing potential increased from 1,072,240 to 1,173,320 barrels daily during the year.

A total of 651 wells were completed during 1946, of which 562 were oil wells, seven gas wells and 82 dry holes. Output of refined products during the first eleven months of 1946 amounted to 32,225,249 barrels, of which 24,672,329 barrels were exported.

All Five Brazil Fields Show January Production

Crude oil production in Brazil during January, 1947, totaled 8798 barrels. December production was 5790 barrels. The monthly report of Conselho Nacional de Petroleo, Brazil's National Petroleum Council, showed that the country's five fields all participated in the monthly production.

A majority of the output came from the Candeias field where 12 wells produced 7830 barrels during January. The Lobato field, on production for the first time in more than a year, had one well producing for an output of 533 barrels. Aratu's two wells flowed 316 barrels and a single well in the Itaparica field accounted for 111 barrels. The one-well Pitanga field, discovered in 1946, produced 8 barrels during January.

Russia's Production Up; Argentina Plans Gas Line

Russia's crude oil production in 1946 totaled approximately 166,827,000 barrels, an increase of about 12 percent over 1945, according to reports reaching the Department of Commerce.

Another report stated that Argentina plans to meet 82 percent of its gas consumption with natural gas by the end of 1951 under a "Five-Year Plan" for the gas industry. The plan calls for construction by 1949 of a pipe line from the oil fields in the Comodoro Rivadavia district to Buenos Aires. Bids already have been invited.

Russia Refused Shipment

The House Appropriations Committee has rejected a request from the State Department for authority to ship some $25 million worth of equipment, about half of it oil-industry needs, to Russia.

The material was originally designed to be shipped under lend-lease but when that program was terminated last year Russia purchased it on lend-lease terms, which called for assumption of shipping costs by the U. S.

The Senate Appropriations Committee already has turned down the request.

Visitors at Meeting of Nomads

—Photos by Bourdon

Foreign visitors attending the March meeting of the Houston Chapter Nomads are shown in the picture above, left to right as follows:

W. R. Leard, Socony-Vacuum Oil Company, Cucuta, Colombia; R. N. Posgate, Shell Oil Corporation, Maracaibo, Venezuela, and D. D. Lewis, Calgary, Alberta, Canada.

Other visitors included J. C. Hill, of the Sid Richardson interests, Fort Worth, (at the left in the lower picture) and his father, J. Z. Hill (right), who was recently retired after long service with the Gulf Oil Corporation.

Jerry Rice, vice president of Tennessee Gas & Transmission Co., was the chief speaker.

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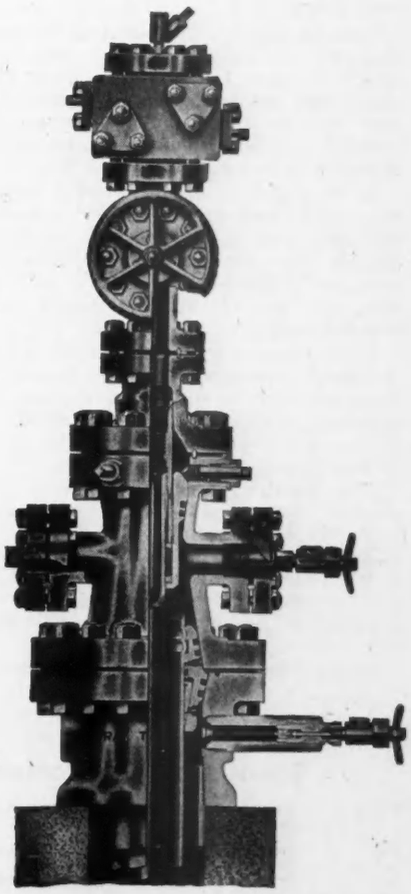

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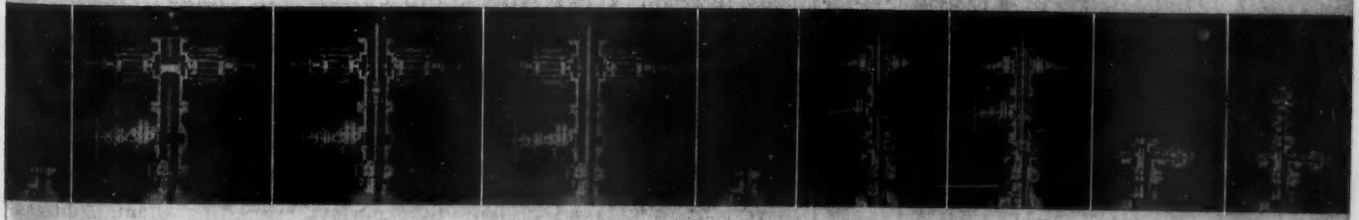

Crude Production At New High for Year; Gasoline Stocks Above Peak for 1946

New 1947 highs in crude production and total refinery activity were marked in the week of March 15, with the increase devoted to the output of gasoline and heavy fuel oil, according to the weekly report of The API.

Gasoline stocks continued to accumulate and reached a level 1½ million barrels over last year's peak. That high mark was reached a month earlier last year and by this time a year ago increased gasoline demand of the spring season was being reflected on stocks.

U. S. daily crude production during the week ended March 15 averaged 4,845,000 barrels, an increase of 21,000 barrels over the previous week's daily rate, and 430,000 barrels or 9.7 percent over the average of last year's comparable week.

Daily charges to refinery stills during the week averaged 4,986,000 barrels to show increases of 61,000 barrels over the previous week's and 372,000 barrels or 8.1 percent over those of the like week of last year.

The Bureau of Mines reported that stocks of refinable crude decreased 1,452,000 barrels during the week of March 8, and on that date totaled 223,679,000 barrels. That figure was 2,433,000 barrels or 1.1 percent less than the 226,112,000 barrels that were on hand a year before.

Production of gasoline, which included natural blended at the refineries, increased 343,000 barrels over the previous week's output to total 15,125,000 barrels. That amount was 1,760,000 barrels or 13.2 percent greater than the output of last year's like week. Stocks of finished and unfinished gasoline rose to 106,813,000 barrels on March 15, which were 2,078,000 barrels or 2 percent more than were on hand a year previously. Gasoline stocks, which are continuing to build, are already 1½ million barrels over last year's high mark, and by this time a year ago spring demand was already showing its reducing effect.

Refinery output of distillate fuel oil dropped 547,000 barrels to 5,025,000 barrels in the week of March 15, which was 750,000 barrels or 13 percent less than was produced in last year's week. Heavy reductions from stocks of this fuel continued during the week, when withdrawals of 2,217,000 barrels dropped the total on hand to 34,384,000 barrels. That total still exceeded last year's inventory by 7,796,000 barrels or 29.3 percent.

An increase of 420,000 barrels brought the week's production of residual fuel oil to 8,916,000 barrels, which was 642,000 barrels or 7.8 percent greater than output a year ago. Although increased production eased stock reductions, 468,000 barrels were withdrawn lowering the total to 43,734,000 barrels. Those stocks of residual were 5,988,000 barrels or 15.9 percent higher than stocks a year before.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

TRENDS OF 1946 AND 1947

Trends in Week Ended	Crude Oil			Gasoline		Gasoil and Distillate		Residual Fuel	
	Production Daily	Runs to Stills Daily	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End
1946:									
January 5	4,548	4,651	218,193	14,488	98,494	5,923	35,199	8,867	42,371
January 26	4,626	4,553	220,544	13,622	101,737	5,710	29,498	8,411	39,722
February 23	4,714	4,595	226,699	13,175	104,709	5,728	25,398	7,913	39,290
March 30	4,425	4,684	224,994	13,896	104,715	5,337	28,240	8,738	37,746
April 27	4,672	4,685	224,443	14,228	99,631	5,568	30,466	9,204	39,404
May 25	4,759	4,857	222,214	14,312	95,769	5,463	32,973	8,908	43,368
June 29	4,957	4,854	223,883	14,500	92,333	5,325	37,762	8,828	46,477
July 27	4,926	4,896	223,756	14,535	88,626	5,817	44,316	8,217	49,517
August 31	4,833	4,911	227,132	15,014	87,217	5,630	53,134	8,539	53,173
September 28	4,778	4,829	223,043	14,675	85,324	5,632	59,827	8,172	57,657
October 26	4,730	4,758	221,184	14,863	86,423	5,710	65,499	7,728	60,872
November 30	4,795	4,707	227,693	15,145	88,371	5,258	66,062	7,672	58,647
December 28	4,713	4,968	225,995	15,604	93,126	5,931	58,941	8,181	53,427
1947:									
January 4	4,649	4,917	223,291	15,281	94,882	5,857	58,034	8,375	53,285
January 25	4,672	4,820	221,655	14,624	99,801	5,630	50,357	8,224	48,558
February 22	4,786	4,860	224,580	14,668	103,904	5,929	40,739	8,542	44,919
March 1	4,771	4,896	225,131	15,191	105,803	5,488	38,004	8,824	45,175
March 8	4,824	4,925	223,679	14,782	106,418	5,572	36,601	8,496	44,202
March 15, 1947	4,845	4,986	.....	15,125	106,813	5,025	34,384	8,916	43,734
March 16, 1946	4,415	4,614	[5]226,112	13,365	104,735	5,775	26,588	8,274	37,746
Change:									
In Week	+21	+61	−1,452	+343	+395	−547	−2,217	+420	−468
In Year	+430	+372	−2,433	+1,760	+2,078	−750	+7,796	+642	+5,988
In Year	+9.7%	+8.1%	−1.1%	+13.2%	+2.0%	−13.0%	+29.3%	+7.8%	+15.9%

[1] All time peak. [2] Lowest between January, 1922 and July 1, 1944. [3] Lowest since October, 1922 due to shutdown of six Mid-Continent states. [4] Lowest since December, 1921. [5] Stocks, March 9, 1946.

Increase in Crude Prices Spreads to Pacific Coast

The increase in crude prices that spread to all producing areas east of the Rocky Mountains during the past several weeks has been made nation-wide by its extension to the West Coast. Along with the California raise came the announcement of increased refined product prices, the consequence of other areas' hikes.

Standard Oil Company of California last week ennounced it will pay an increase of 25 cents a barrel for all grades of crude it purchases of 20-gravity and above, and from 20 to 24 cents a barrel more for grades of lower gravities. The company further announced its retail gasoline prices will be advanced .8 cent per gallon, gas oils .7 cent per gallon, and fuel oil 20 cents a barrel. All price changes were made effective March 19.

"To stimulate the search for much-needed oil in California and to bring California crude oil prices more nearly in line with prices prevailing in the Mid-western and Gulf oil fields," Standard said in making its new postings. Two price advances, totaling 35 cents, had been made in other U. S. producing areas since the last adjustment in California.

This California price increase just preceded the passing of a resolution by the Board of Oil Producers of California demanding a 35 cents a barrel advance in crude prices and comparable increases for finished products. A spokesman for the board said members had discussed advisability of independent producers shutting in their wells until purhcasing companies met recent Mid-Continent increases.

Canadian price ceilings on gasoline and tractor distillates will be lifted April 1, according to an announcement by the Dominion Wartime Prices and Trade Board. End of ceilings is expected to bring substantial increases in refined products prices and in field prices for crude.

Norway Credit to Buy Oil

The Export-Import Bank will finance the purchase in this country by Norway of $5 million worth of petroleum, oil and lubricants out of a $50 million credit extended to the Norwegian government. Although the credit was authorized by the bank in July, 1945, it has only now been formalized.

Purchases under the credit which will run until June, 1948, are to be carried out so far as possible by private importers in Norway through normal commercial channels.

Oil Export Tip Sheet

A tip sheet for American exporters of oil products, giving names and addresses of foreign companies interested in purchasing or in obtaining agency accounts, has been initiated by James H. Mayes, chief of the Department of Commerce fuels and lubricants section.

The monthly letters will be sent only to exporters requesting them. Address Office of International Trade, Department of Commerce, Washington 25, D. C.

Record Depth Well, Bottomed at 17,236 Feet, Encounters First Major Trouble

World's deepest test encounters first major trouble, with stuck drill pipe; Bromide production indicated in Southwest Antioch pool; testing of pool opener near Elmore City continues; new zone proved at Garden Grove pool; Seminole County well opens small pool; oil pool opened in Carter County; McClain County pool may be extended northwest.

Caddo County: First major difficulty encountered in more than a year of continuous operations at the world's deepest well occurred March 15 when drill pipe became stuck between 25 and 40 feet off bottom. The well, The Superior Oil Company of California's Weller 51-11, NW NW NE 11-8n-12w, near Fort Cobb, is bottomed at 17,236 feet. Edward Smith of Superior's Oklahoma City office, reported that crews were attempting to wash the pipe loose. J. C. Cody, Superior's drilling superintendent from Los Angeles, is assisting C. L. Corley, drilling superintendent at the Weller, in attempts to free the pipe.

There have been minor mechanical difficulties in machinery at the rig, but Smith said this fishing job was the most serious trouble yet encountered in more than a year of operation. Only 1 other fishing job was necessitated, which proved to be of minor nature. Until drill pipe became stuck March 15, the well was averaging about 20 feet of hole per day.

Garvin County: A second producing zone in the Southwest Antioch pool has been opened by Globe Oil & Refining Company and Vickers Petroleum Company. Carr Community 1, NW NE SE 29-3n-2w, recovered 44-gravity oil on a drill-stem test in the Bromide sand, giving first indication of production in a lower zone in the pool. Pay is from the Gibson sand (Pennsylvanian) at other wells. The Carr is on the east side of the pool. A drill-stem test at 7275-93 feet in Bromide, topped at 7272 feet, showed gas in 4 minutes. A total of 1200 feet of 44.2-gravity oil and 450 feet of salt water were recovered on the test. Flow pressure varied from 475 to 1000 pounds, and bottom hole pressure failed. Operators drilled ahead and found sand at 7300 feet, with light stain and odor. This formation will be based before crew sets pipe.

Elmore City Area: Anderson-Prichard Oil Corporation et al's discovery well near Elmore City continues testing. The well, Seaton 1, SE SE NW 14-2n-2w, was perforated at 6424-54 feet, where it flowed an estimated 50 to 100 barrels of oil per hour on a drill-stem test. Total depth is 6507 feet.

Okfuskee County: J. E. Crosbie, Inc., et al have opened a new zone in the Garden Grove pool with Schultz 1, SE NE SW 30-12n-7e, and operators plan to rework an old dry hole near by. Schultz 1 opened production in the Earlsboro sand at 3348-64 feet, making 93 barrels of oil per day through open tubing. Other wells in the pool produce from the Prue at about 2900 feet. The old dry hole to be reworked is Davis 1, SW SW SE 30-12n-7e. This test was abandoned at 4373 feet in the Hunton lime.

Seminole County: A new productive spot in the Wewoka district has been opened by Davon Oil Company of Oklahoma City. The pool opener, Mee 1, NE NE SW 16-8n-7e, is producing from the Cromwell sand zone. Carried to the Wilcox sand where water was found at 4269 feet, pipe was set at 4258 feet, and casing perforated with 18 holes in top of the Cromwell, from 3260-62 feet. The well cleaned itself and tanked 15 barrels of oil the first hour and 12½ barrels the second hour, flowing through a 3-inch flow line and 5½-inch casing. Estimated gas flow was 2½ million cubic feet a day. Before testing the Cromwell, pipe was perforated opposite the Hunton lime at 3996-4092 feet, where the well showed an estimated 30 barrels of oil per day, accompanied by a large amount of water. These perforations were squeezed. Crew was to run tubing and resume testing of the Cromwell, of which there is an estimated 12 to 16 feet of pay.

Carter County: H. F. Gibson apparently has opened a good oil pool west of the Brock pool, in the southern part of the county. Smith 1, NW NW SW 14-5s-1w, is testing after making water shutoff. The new well, which is southeast of the Lone Grove pool, reperforated at 4134-48 feet and ran tubing to 4101 feet. The test flowed 105 barrels of oil, with a trace of water, in 12 hours. After a brief shutin it flowed 114 barrels of oil, no water, in 24 hours through open tubing.

McClain County: A ¾ mile northwest extension is likely for Southwest Wayne pool. R. H. Dearing, Inc.'s Howard 1, NW NW NE 15-5n-2w, recovered 240 feet of oil-cut mud, with free 40-gravity oil on top on a drill-stem test at 7061-75 feet. Gas showed in 18 minutes. A core from the same sand at 7063-75 feet recovered fine-grained saturated sand. Testing is continued.

• Kansas

Old Perth Area Is Revived; Rush County Oil Pool Likely

Old Perth area revived; Rush County wildcat may open oil pool; Deerhead pool may be extended south.

Sumner County: A surprise well which

Wells Completed in the United States in Week Ended March 15, 1947

Data preliminary and subject to revision. Revised and more complete data on all completions and exploration shown in monthly summaries published in last issue of each month.

State or District	FIELD COMPLETIONS: New Wells: Oil	Dist.	Gas	*Input	Dry	Total	Old Wells Deepened	EXPLORATORY COMPLETIONS: Oil	Dist.	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	This Week 1946
Arkansas	3				2	5			1		1	2	7	3	
California	32				3	35	2	3			2	5	42	45	37
Colorado	2					2							2	7	1
Florida														1	
Georgia											1	1	1		
Illinois	19				5	24		1			9	10	34	38	39
Indiana	8		1		1	10		1			2	3	13	8	9
Kansas	7		9		6	22	4	2		1	7	10	36	56	50
Kentucky	3				4	7					3	3	10	1	8
Louisiana	8		1		5	14					5	5	19	18	11
N. Louisiana	4		1		2	7					4	4	11	8	8
S. Louisiana	4				3	7					1	1	8	10	3
Michigan	2				2	4		1			6	7	11	11	10
Mississippi	5		2		1	8							8	2	2
Montana			1			1							1	4	3
New Mexico	4					4					1	1	5	11	4
New York	15			9		24							24	25	25
Ohio	1		9		5	15	1				2	2	18	14	19
Oklahoma	42		5		13	60				1	22	23	83	82	48
Pennsylvania	27			15		42							42	49	42
Texas	96	2	8		20	126	6	5		2	24	31	163	163	205
Districts:															
1. S. Central	6					6					5	5	11	7	3
2. Middle Gulf	6				2	8				1	4	5	13	14	[1]
3. Upper Gulf	8	1	1		3	13					2	2	15	13	13
4. L. Gulf-S.W.	11	1			6	18	2	1			4	5	25	23	39
5. E. Central	2					2							2	1	[2]
6. Northeast	6		1		1	8					1	1	9	4	19
7-B. N. Central	2					2		1					3	17	[3]
7-C. W. Central	3		1			4		1				1	5	4	[4]
8. West	22					22	2	2			3	5	29	38	67
9. North	27				7	34	2				4	4	40	32	56
10. Panhandle	3		5		1	9				1	1	2	11	10	8
West Virginia	1		11		2	14							14	16	8
Wyoming	3				1	4		1				1	5	4	3
Total U. S.	278	2	47	24	70	421	13	14	1	4	85	104	538	558	524

* Includes salt water disposal wells. [1] Middle Gulf included with Lower Gulf-S.W. [2] East Central included with Northeast. [3] N. Central included with North. [4] West Central included with west.

flowed on test at the rate of approximately 55 barrels of oil an hour, has apparently revived the old Perth pool. Falcon-Seaboard Drilling Company's Skaggs 1, CSE NW 12-33s-2w, flowed 198 barrels of oil in 3½ hours, making 86 barrels the first hour, 54 barrels the second hour, 32 barrels the third hour and 26 barrels in the last half-hour. The test is bottomed at 4246½ feet in Simpson sand, topped at 4242 feet. The Perth pool was opened in June, 1945, by The Carter Oil Company's Latimer 1, a 157-barrel well in CNW NE 12-33s-2w. The pool was removed from the state prorated pools list January 1 because of declining production.

Rush County: A closely-watched wildcat is J. W. Huber Corporation et al's Ficken 1, NW NW NE 32-19s-18w, 13 miles west of the Ryan West pool. The well recovered 20 feet of oil and gas-cut mud in a 30-minute drill-stem test in the Arbuckle, from 4057-4080 feet, and crew continued to test this formation. The test is on the southern edge of the county.

Barber County: Sinclair Prairie Oil Company is trying to extend the Deerhead pool ¼ mile south. The DeGeer 1, NE NW NE 34-32s-15w, was last reported drilling at 4300 feet, and as far as is known no commercial shows have been encountered.

• New Mexico

Lea County Test Assured of Production from Three Zones

Lea County wildcat improves in outlook, with production assured from 3 zones in the San Andres; Drinkard field extension to stimulate operations; Chaves County wildcat has thick Permian beds.

Lea County: The Texas Company's Garrett 1, C NE SE 22-16s-38e, 9 miles east by north of the Lovington field, was swabbing at a rate of 24 barrels of 27-gravity oil daily after acidizing perforations at 5300-400 feet. A previous test after acid of perforations at 5415-5540 feet yielded 6 barrels of oil hourly on swab, while test of open hole at 5540-690 feet yielded 49 barrels of 30.6-gravity oil on 8-hour swabbing run. The combined oil output of the 3 zones in the San Andres, topped at 4940 feet and drilled to 5760 feet, removes all doubt of making commercial production.

Amerada Petroleum Corporation's Hare 4, SE SW 33-21s-37e, ⅜ mile northwest extension for the Brunson field, was making a production test of initial perforations at 7900-28 feet. This outpost entered the Ellenburger at 7680 feet, with elevation of 3459 feet, and granite-wash at 7926 feet. Solid granite appeared at 7628 feet.

Mid-Continent Petroleum Corporation has started an east offset to State 1-15, which extended the Drinkard field 1¼ miles north with natural flow from Yeso perforations at 6560-6630 feet. Amerada's State 1-D-A, C NW SW 16-21s-37e, was rigging up as a north offset. Continental Oil Company et al's Lockhart 1-A-27, C SW NE 27-21s-37e, registered a potential of 1624 barrels of 40-gravity oil initial through ¾-inch choke after acidizing Yeso perforations at 6534-48 feet and 6554-64 feet. This prolific well is 2 miles southeast of the Mid-Continent extension.

Chaves County: Honolulu Oil Corporation et al's Mullis-Federal Unit 1, C SE SW 21-15s-29e, Ellenburger prospect, has established a new depth record for the county in drilling shale at 9310 feet.

San Juan County: Byrd-Frost, Inc. et al's Hargrove-Federal 1, Kutz Canyon area, encountered water near the 6700-foot level in the Dakota, and was idle at 6711 feet. Owners plan to change rigs and deepen to the Morrison section. While the Dakota yielded a nominal volume of gas with distillate, it did not indicate commercial flow considering the depth.

• West Texas

Crockett Wildcat Has Prolific Flow of Oil from Crinoidal

Crockett County wildcat makes prolific oil flow from Crinoidal; Ellenburger prospect near Crane-Ector County line has showings to confirm favorable structural position; water reappears in deep discovery for Jordan field.

Crockett County: Cities Service Oil Company-Plymouth Oil Company and Humble Oil & Refining Company's Owens 1-B, C SW NW H&OB 6, Block GG, 1¼ miles northwest of the Clara Couch field, was drilling lime at 5730 feet to explore the Ellenburger before running pipe for completion. This wildcat passed up flowing production from the Crinoidal, topped at 5615 feet. A drill-stem test at 5612-70 feet yielded gas to the surface within 2 minutes at a 500,000-cubic-foot daily rate, and flowed oil in pits. A retest at 5601-70 feet yielded gas within 3 minutes and oil flow in 10 minutes. After cleaning itself the well flowed 40 barrels of 38-gravity oil in 45 minutes through tester, thus comparing with average Crinoidal producer in the Todd field. The well is on a 41-acre drilling site, and the cost will be borne by each of the 3 companies on an equal basis, but their respective lease holdings will not be merged.

The Crinoidal lime is Basal Pennsylvanian, and has an excellent production record in the Todd field, which also produces from the Ellenburger. The Crinoidal averages 117 feet in pay thickness in this area.

Ector County: Gulf Oil Corporation and E. E. Fogelson's University 1-A, deep-pay discovery for the Jordan field, flowed 224 barrels of 42.7-gravity oil and 57 barrels of water initial through 3/16-inch choke from Ellenburger perforations at 8925-35 feet. Water was not evident with the oil flow for several days in advance of the official gauge. The Texas Company has authorized a west offset, and Gulf-Kewanee Oil Company's University 1-A, C SW NE Sect. 8, Block 35, was rigging up as a ¾-mile southeast outpost.

Texas' Connell 31, C NW SW PSL 29, Block B-16, 3 miles west by south of the Jordan-Ellenburger discovery and an Ordovician wildcat, was due to run tester near the 5450-foot level on the strength of a reported oil showing in the Tubb zone. Favorable showings had been recorded in the Glorietta, which tested 1900 feet of oil and 300 feet of sulphur water.

Coke County: Sun Oil Company's Fred Jameson 1, south offset to the Crinoidal lime discovery zone for the Jameson field, was making production test at 7073 feet from 28 feet of open hole in Ellenburger, topped at 7045 feet with elevation 2065 feet. Drill-stem tests were not decisive. Ellenburger formation samples indicated a gas-cap zone, and also oil near bottom.

Hockley County: George P. Livermore, Inc.'s Moore-Texaco 1, southeast corner Labor 18, League 721, State Capitol Lands, and 5½ miles northeast of the Levelland field, cemented pipe at 4781 feet to test broken oil and gas showings in drilling the San Andres to the 4800-foot level. This wildcat entered the San Andres at 3919 feet, according to preliminary call, with elevation of 3650 feet. A large volume of leases in the area expires in April and July.

Gaines County: Cities Service Oil Company's Riley 1, 4½ miles northwest of the Doss field and possibly an extension well, was cleaning out after 330-quart nitro shot at 7060-237 feet in the Clear Fork. It failed to register continuous oil flow following acid treatment of open hole at 7039-251 feet.

Winkler County: Mid-Continent Petroleum Corporation's TXL 1-N, exploring the TXL field production trend northwest, was drilling at 7840 feet with the Devonian anticipated near this level. Amon Carter et al's Wright-Gulf 1, wildcat, was drilling at 11,120 feet, having entered the Montoya at 10,780 feet, or 421 feet low to a failure 3 miles northwest.

• North Texas

Montague County Test Yields Natural Oil Flow from Strawn

Montague County semi-wildcat develops natural oil flow from Strawn; Bryson field deep strike in Mississippi has 24 feet of effective oil pay.

Montague County: S. D. Johnson et al's Hodges 1, southwest corner of Sam Epps Survey and east of the Eason Oil Company's semi-wildcat pumper on the south end of Bowers field, renewed interest by flowing 40 barrels of oil hourly natural through ¾-inch choke from Strawn sand at 4025 feet.

Jack County: Thos. E. Berry and Hill and Hill's Clayton 1, L. Knight Survey A-324, and 1900 feet west by north of a 4600-foot Marble Falls pay discovery for the Bryson field, was drilling plugs to complete in Mississippi oil pay at 5158 feet. Clayton 1 proved dry in the Marble Falls, and entered the Mississippian at 5073 feet, with most effective saturation at 5124-49 feet.

Archer County: L. T. Burns et al's Andrews 2, C NE SW Sect. 1806 TE&L Company Survey, flowed 120 barrels of 42-gravity oil initial after acidizing perforations at 4464-78 feet in Bend, topped at 4459 feet. The gauge was through 12/64-inch choke, and represents an average completion for the Burns-Benson field, which is developing into one of the largest Bend lime areas in the county. Production has been progressively advanced north by Homer W. Snowden Oil and Gas Company and C. T. Robertson et al.

Knox County: W. J. Moran and John J. Moran's Brown 1, 1¼ miles south of the 6200-foot Bend lime discovery pumper fo. the Truscott area, missed this projected producing horizon and was scheduled to abandon near the 6500-foot level.

Haskell County: Amerada Petroleum

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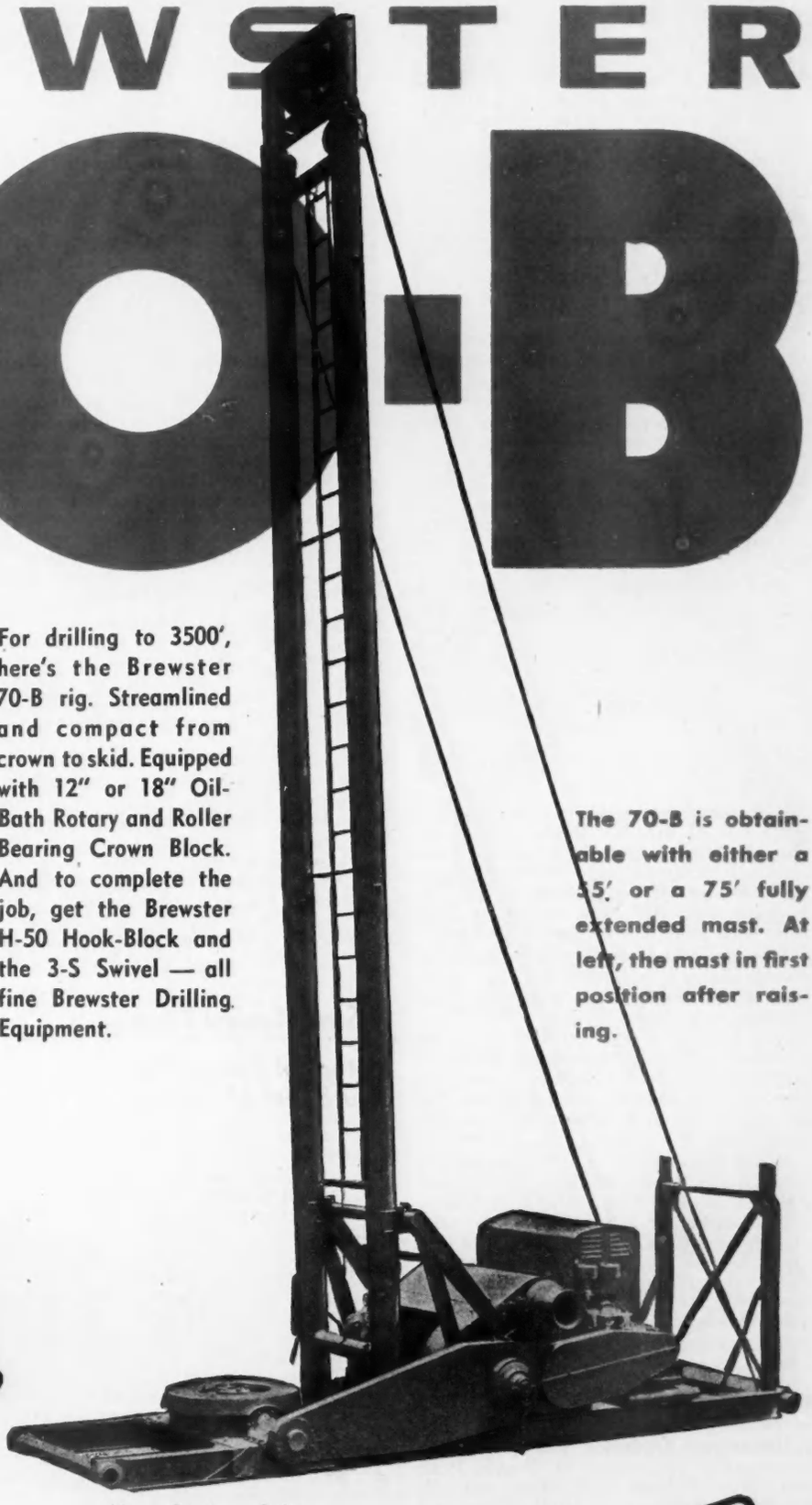

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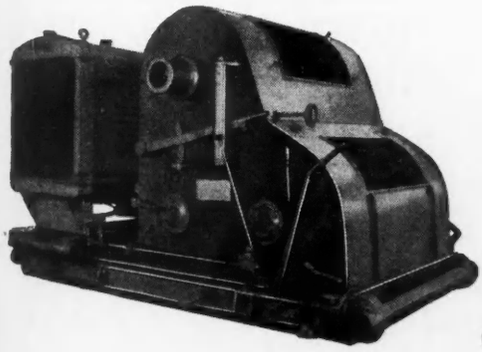

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Corporation's Holt 1, north edge of the Humphrey-Chapman field, was drilling at 2860 feet after proving dry in the Canyon at 2515-30 feet. Thos. D. Humphrey's Chapman 3, 1023-foot south offset to his Strawn discovery, was awaiting production test after setting pipe through the oil zone.

• East Texas

Smith County's Sand Flat Field Extended ½ Mile

Sand Flat field expanded ½ mile northeast; Mount Sylvan field outpost is a failure in Paluxy; Cherokee County wildcat reaches the Rodessa series.

Smith County: General Crude Oil Company's Gentry & Shamburger 1, J. G. Garrett Survey, advanced Paluxy production in the Sand Flat field ½ mile northeast in making 407 barrels potential from perforations at 7082-114 feet with elevation of 484 feet. Shell Oil Company is due to drill a west offset.

Van Zandt County: Humble Oil & Refining Company's Woods 1, M. Langham Survey and a southwest outpost for the Mount Sylvan field, was due to run a routine drill-stem test at 7393 feet, although no oil or gas shows have been logged since entering the Paluxy series at 7315 feet. With elevation of 416 feet, it is structurally low, and the outlook for oil above the Paluxy water table is very doubtful.

Cherokee County: Delta Drilling Company and Al Brown's Lester 1, John H. Russell Survey and on a faulted geophysical prospect, was drilling Upper Rodessa at 7950 feet without shows. The massive anhydrite was called at 7705 feet, with base at 7900 feet.

Standard Oil Company of Texas' New Birmingham 1, wildcat that has been testing for weeks, was showing about 250,000 cubic feet of gas daily from Bacon perforations at 8638-52 feet. Additional perforations will be made higher in the Bacon before acidizing. A commercial well appears probable, but the gas yield may not be profitable at this depth.

Wood County: B. F. Phillips et al's Kennedy 1, A. C. Walters Survey and 300 feet southeast of a 6778-foot failure, was showing for a Sub-Clarksville sand producer on the southeast side of the Quitman field. A commercial pumper was indicated after making swabbing test of 20 feet of effective pay between 4056 feet and 4088 feet. The hole is bottomed at 4390 feet.

Shell's Goldsmith 12, Quitman field deep test, was coring at 10,370 feet after several dry tests of the Cotton Valley series.

Limestone County: The Pure Oil Company's Berthelson 40, Travis Peak test for the Mexia field, recovered salt water in using tester at 4624-36 feet and 10 feet of rotary mud with trace of gas at 5142-48 feet. Another test was pending at 5156 feet.

Houston County: Daniel Oil Company's Boykin 1, Jacob Prewitt Survey and a Woodbine prospect for the Neches area, entered the Austin chalk at 5550 feet, and was drilling at 5620 feet. Contiental Oil Company's Texas Long Leaf Lumber Company 1, Edwards test for the Creek area, was drilling shale at 8250 feet. Magnolia Petroleum Company's Grounds 1, 6 miles southeast of Grapeland and a Rodessa prospect, was drilling at 8240 feet, having entered the Georgetown at 6980 feet with elevation of 418 feet.

Marion County: Magnolia Petroleum Company et al's Cotton Valley test, Hall Estate 1, Miles Moody Survey, in the 1-well Lassater field, is plugging back after a series of unproductive tests into the Travis Peak producing zone of the discovery well and will test at 9075-119 feet. The latest test of Cotton Valley perforations was at 9300-53 feet, with recovery salt water and mud. The Cotton Valley was topped at 9160-70 feet, and the well went to total depth of 10,241 feet.

Harrison County: Placid Oil Company's Dunn 2, S. B. Simpson Survey, 2 miles northwest of Harleton in the Whelan field, reported improved production after an acid treatment. Dunn 2's natural open flow of 12½ million cubic feet of gas daily, has increased to 38 million cubic feet. The well produces from the Rodessa through perforations at 6890-6902 feet.

Humble Offers Fellowships In Science and Engineering

Offers to establish 12 one-year fellowships in science and engineering have been made by Humble Oil & Refining Company to five universities in the southwest and south and to Masssachusetts Institute of Technology.

The fellowships will pay the holders the sum of $1250 per academic year, and in addition, the fellowships in geology will provide an extra $500 to cover field work in the summer. Recipients of the fellowships will be students who are enrolled in Masters or Doctors degree work, and selection of these students will be entirely in the hands of the universities.

• South Central Texas

Potential Run on Discovery Southwest of Lockhart

Potential run on new discovery southwest of Lockhart; Frio County wildcat cores for Edwards lime.

Caldwell County: J. G. Pundt et al's C. F. Richardson 1, discovery 5 miles southwest of Lockhart, has been completed as an oil well. On potential the well pumped 66½ barrels of 38-gravity oil daily from open hole at 1608-64 feet. With junk in the bottom of the hole, it was drilled out to 1580 feet and 2-inch tubing run to 1490 feet for completion. Production is from the Austin chalk, topped at 1606 feet. The well is 330 feet from the southeast and southwest lines of a 309-acre tract in Andrew Churchill survey A-66. Drilling operations are under way on the Richards 2 well, 660 feet north of the discovery.

Frio County: Magnolia Petroleum Company's McKinley 1, wildcat 6½ miles northeast of Pearsall, is coring below 5713 feet for the Edwards lime after making several drillstem tests. On a drill-stem test at 5591-5601 feet, 25 feet of oil-cut mud was recovered in 20 minutes with no working pressure using ¼-inch choke. Another test at 5604-11½ feet recovered 100 feet of oily mud and 15 feet of salty water in 15 minutes with no working pressure, and another at 5621-31 feet recovered 40 feet of oil-cut mud.

• Southwest Texas—Lower Coast

La Gloria Field Outpost Being Completed as Oil Producer

La Gloria field outpost being completed as oil producer; casing set in wildcast southeast of Willman; first oil well at Cam runs production test; production of new deep pay zone at Alta Mesa gauged.

Jim Wells County: Republic Natural Gas Company's Charles Scott, Trustee 1, La Gloria field extension in La Gloria townsite, is being completed as an oil producer. A drill-stem test at 6120-30 feet recovered 525 feet of oil in 10 minutes with 10 pounds working pressure. Total depth is 6200 feet and 5½-inch casing has been set on bottom. This well is about 2 miles northeast of south flank oil production at La Gloria field. An east offset to the well has been located by Tide Water Associated Oil Company.

San Patricio County: J. W. Gorman's W. B. Cox 1, wildcat southeast of Willman field, tested gas below 5100 feet and set casing to total depth of 5235 feet. On the drill-stem test at 5187 feet the well developed 500 pounds working pressure and flowed gas. This wildcat is in Delgado Grant on a 1217-acre lease.

Duval County: B. C. Graham & Cam Corporation's Rosa Benavides 2, first oil well in the Cam field, gauged on production tests 75 barrels of 39.3-gravity oil daily through 9/64-inch choke. Tubing pressure was 165 pounds and casing pressure 785 pounds. Total depth is 3365 feet with 5½-inch casing set on bottom and perforated for completion at 2656-64 feet in the Government Wells zone. This well is 660 feet southeast of the Benavides 1 gas discovery completed in January from the Yegua at 3319-25 feet.

Brooks County: Standard Oil Company of Texas' Mestena O&G Company 32 is being completed in a new deep pay zone at Alta Mesa field. On production test it gauged 141 barrels of oil daily through 5/32-inch choke on dual completions of perforations at 4521-23 feet. Gauge of production from perforations at 4965-70 feet was 127 barrels of oil daily through ⅛-inch choke. Total depth is 6851 feet with 5½-inch casing set to 5012 feet.

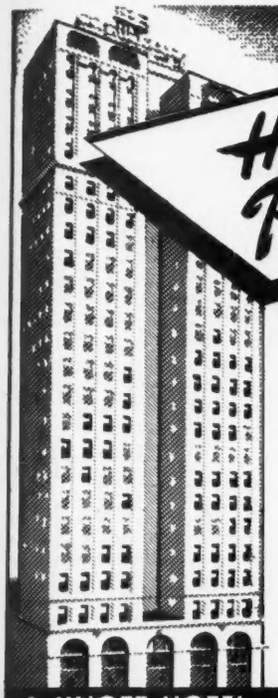
• Middle Texas Coast

Potential Test Made of Refugio County Discovery

Potential test made of new Roche field discovery in Refugio County; new deep pay discovery at Burnell-Wilcox given potential; wildcat south of Mineral drilling after testing Luling sand; Live Oak wildcat coring below 7394 feet.

Refugio County: Potential has been run on Hewitt & Dougherty's Kathleen D. Roche 1-A, discovery about 4 miles northwest of La Rosa field. The well flowed 155 barrels of 38.5-gravity oil daily through ⅛-inch choke with gas-oil ratio 1263/1. Tubing pressure was 1500 pounds and casing pressure 2500 pounds. Total depth is 6818 feet with 7-inch casing set on bottom and perforated for completion at 6814-18 feet. Operations have started on No. 2 well, 933 feet northeast of the 1-A discovery. The field has been named Roche.

Karnes County: Stanolind Oil & Gas



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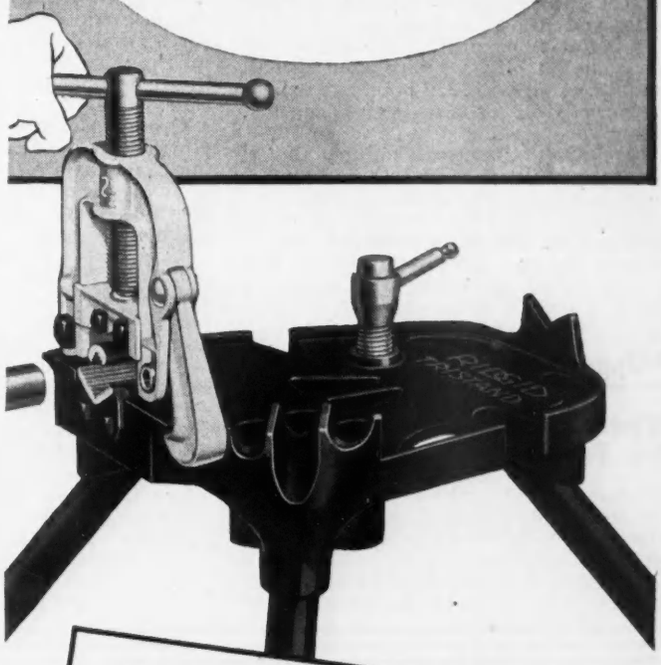

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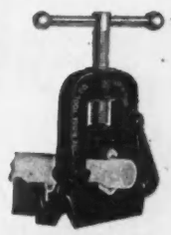

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Company's Ruhman 1, new deep pay discovery at Burnell-Wilcox field, flowed on potential 152 barrels of 39-gravity oil daily through 9/64-inch choke. Tubing pressure was 760 pounds, casing pressure 1575 pounds, and gas-oil ratio 493/1. Total depth is 8520 feet with 7-inch casing set to 8514 feet and perforated for completion at 6966-70 feet at the top of the Massive Wilcox.

Bee County: Gasoline Production Company's Yoward 1, wildcat over a mile west of Mineral field, is drilling after making a drill-stem test in the Luling sand. The test was made at 7634-41 feet and recovered 1250 feet of salt water and 1000 feet of water cushion in 20 minutes. A prior drill-stem test of the Slick sand at 7487 feet recovered a small amount of oil with 250 pounds working pressure. Hole is now being deepened below 7694 feet.

Live Oak County: Continental Oil Company's Albert West 1-D, wildcat 3½ miles northwest of George West, is coring below 7394 feet. Previously a drill-stem test at 6792-96 feet tested gas-condensate and another test at 6980-85 feet tested oil and salt water. This test is in the J. Poitevent Survey A-327.

• Upper Texas Coast

Wharton County Discoveries Are Testing for Completion

Two gas discoveries in Wharton County testing for completion; producer completed at North Port Neches; casing set in San Jacinto County wildcat.

Whatron County: Wirt Franklin Petroleum Corporation's E. J. Steves 1, wildcat 2 miles north of Louise gas field, is being completed as a discovery. On initial test the well flowed gas with a little condensate through 15/64-inch choke with 2450 pounds flowing pressure. Total depth is 6508 feet with 5½-inch casing set to 6497 feet and perforated for completion at 6354-58 feet.

Cockburn Oil Corporation's Wharton Bank and Trust Company 1, wildcat 3 miles south of Lane City and 3½-miles northeast of Withers field, is another gas discovery. The wildcat flowed on initial test approximately 2 million cubic feet of gas daily along with a spray of condensate, flow being through ¼-inch chokes with 2000 pounds flowing pressure. Total depth is 5650 feet with 5½-inch pipe set to 4600 feet and completed in sands topped at 4540 feet in the Miocene.

Orange County: A producer for the North Port Neches field is Hinkle Drilling Company's Adcock 2, 660 feet northwest of the discovery. On potential the well flowed 191½ barrels of 38.2-gravity oil daily through ⅛-inch choke with 1425 pounds pressure on tubing. Total depth is 8781 feet with 5½-inch casing set on bottom and perforated for completion in the Hackberry discovery sands at 8775-80 feet.

San Jacinto County: Casing has been set in Mac Drilling Company's Cynthia Payne 1, wildcat in the Evergreen townsite area 5 miles west-southwest of Cold Spring production. Hole was drilled to 8260 feet in the lower Wilcox sands where water was tested. A previous drill-stem test at 7688-7700 feet flowed oil and gas with 1600 pounds bottom hole pressure and built up to 2000 pounds in 20 minutes. Five and a half-inch casing has been set to 7894 feet.

Poor, blind benevolent Uncle!

Uncle Sam reminds us of a man who consistently borrows money to make benevolent contributions, and to support his own and his wife's indolent and indigent relatives. In its March 22nd issue, Collier's ends an article on this subject with a most pertinent and significant question: "Has **your** government check arrived yet?" Millions get 'em, including your friends, relatives and neighbors. Millions more are eligible. In 1936 Congress appropriated four BILLION dollars for relief. Last year it was eleven and a half billion. Where do we go from here? And WHY? Uncle needs a guardian, and the new Congress seems disgustingly unqualified.

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• South Louisiana

Discovery in Mud Lake Area Is Given Potential Test

Mud Lake area discovery given potential test; Egan north flank outpost being completed; casing set in 4000-foot Lirette extension test; Longville outpost prepared for test.

Cameron Parish: Magnolia Petroleum Company's Lutcher 1-C, gas discovery 4 miles northeast of Mud Lake field, flowed on potential 17½ barrels of 43.5-gravity condensate and 3,907,000 cubic feet of gas daily through 12/64-inch choke. Flowing pressure on the tubing was 3740 pounds and shutin pressure 4700 pounds. Total depth is 11,705 feet with 7-inch casing set to 11,012 feet and 5-inch liner set on bottom. Perforations for completion are at 11,272-309 feet. This discovery is in 24-14s-11w.

Acadia Parish: Irwin & Hudson et al's J. R. Trumps 3-C, north outpost on the west flank of Egan field, cleaned on completion at the rate of 10 barrels of oil hourly through ⅛-inch choke. Flowing pressure on tubing was 1700 pounds and gas-oil ratio estimated at 570/1. Total depth is 10,094 feet with 5½-inch casing set on bottom and perforated for completion at 10,085-090 feet.

Terrebonne Parish: Casing has been set in Union Producing Company's Laterre Company 1, 4000-foot northeast extension at Lirette field. Total depth is 11,600 feet and 7-inch casing has been set to 10,720 feet for production tests. The well is 5300 feet east of gas production and 4000 feet northeast of oil production in 35-19s-19e.

Beauregard Parish: Barnsdall Oil Company's Long Bell Lumber Company 3, ½-mile east of the discovery at Longville field and the third well in the field, has set casing for production tests. Total depth is 8640 feet and 5½-inch casing has been set to 8304 feet. Discovery well of this field was the company's Long Bell 1, completed in December, 1946, from perforations at 8236-53 feet. The Long Bell 2, second producer for the field, was completed in a new sand from open hole at 8570-83 feet.

Texas Group to Meet

The first annual meeting of the Texas Independent Producers and Royalty Owners' Association will be held in Dallas at the Adolphus Hotel April 7. Walter W. Lechner and R. L. Foree head the general committee. Ray E. Hubbard, Kirby building, Dallas, is chairman of the reservations committee and advises that reservations should be made with him as early as possible.

• North Louisiana

Delhi Field Production May Be Extended ½ Mile North

Delhi production likely to be extended ½ mile north; 2 outposts staked in Richland area; Cotton Valley field deep test delayed by fishing job.

Richland Parish: Recent drill-stem test of Gulf Refining Company's Lee Donnell 2, NE SW 19-17n-9e, indicates a ½-mile extension for the Delhi field. The well flowed oil 13 minutes after testing tool was opened, from the Paluxy

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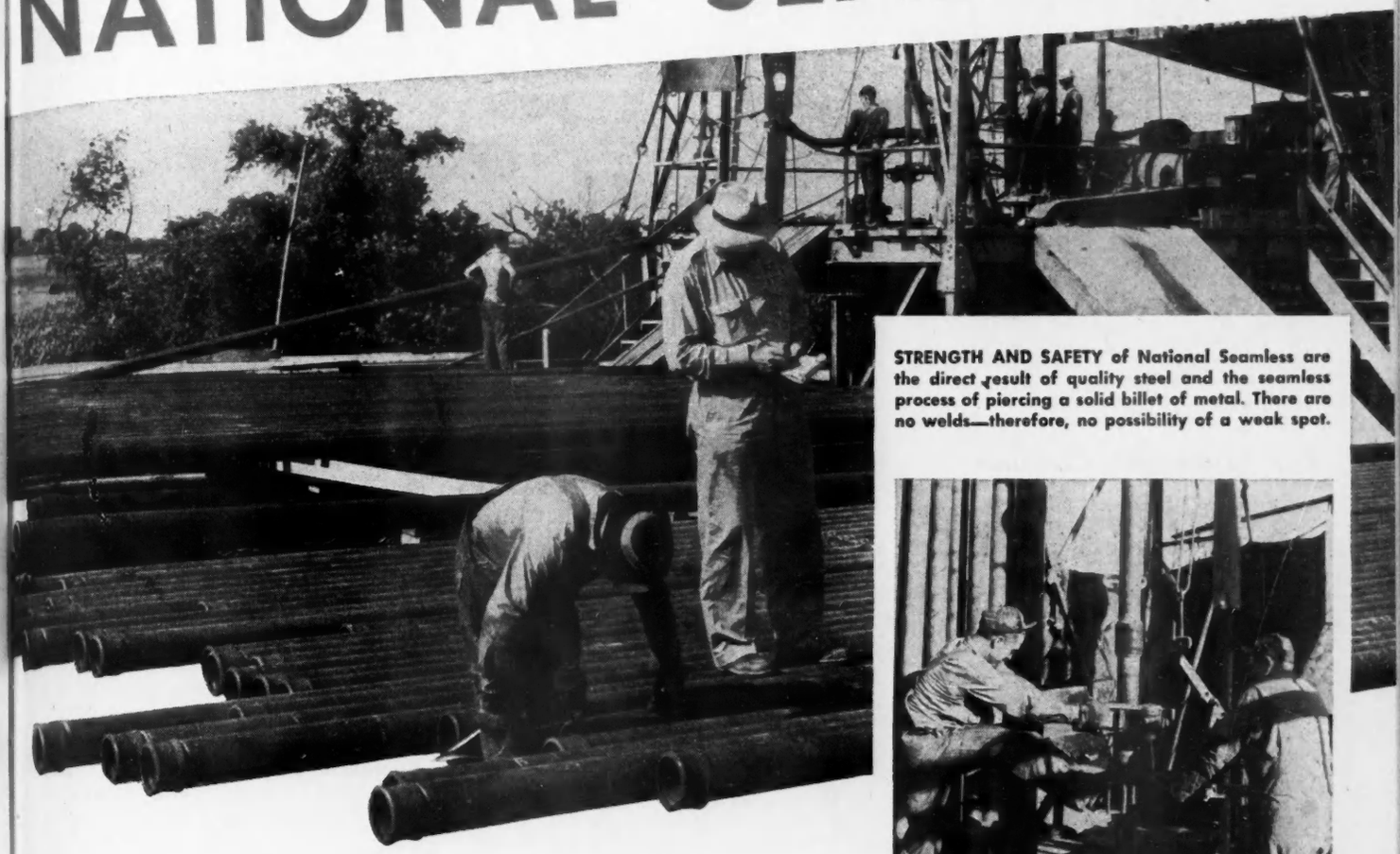

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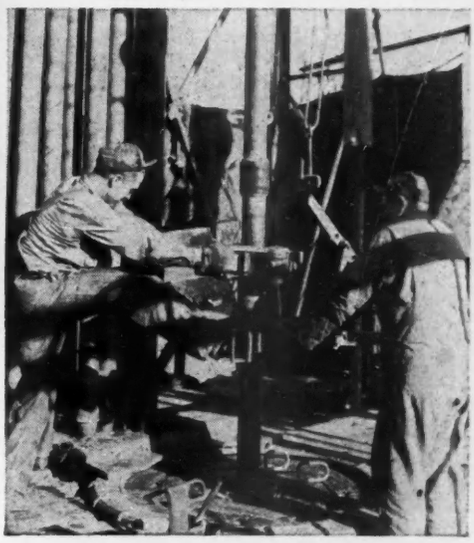

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sand at 3137-48 feet. Drilling went to 3403 feet with 7-inch casing set at 3233 feet. Location is ½ mile north of Magnolia Petroleum Company's Travis 2, in which the Paluxy carried salt water. The Paluxy is higher in Donnell 2.

Two other outpost tests have been announced for the parish. Big Chief Drilling Company's Dr. T. M. Sayre 1, NW NE 15-16n-7e, will be a Tuscaloosa sand wildcat more than 1 mile southwest of Big Creek production. J. Brown Cutbirth et al staked T. C. Nelson 1, SW SW 29-17n-9e, south of Delhi production on the same 40-acre tract as George Stevens et al's Nelson 1 dry hole, which was abandoned at 3438 feet after finding all possible pay sands pinched out.

Bossier Parish: Barnsdall Oil Company et al's Johnson 1, C NE SW SE 30-23n-12w, wildcat 3 miles north of Plain Dealing, plugged back to 3060 feet from total depth of 7510 feet, perforated with 12 shots at 2845-49 feet and squeezed. Operators are waiting on cement and will probably resqueeze.

Webster Parish: Cotton Valley Operators' Committee's Sam Banks 2, C SE NW 34-21n-10w, deep test in the Cotton Valley field, is fishing for stuck drill pipe at 10,575 feet. Total depth is 14,967 feet.

Pay Adjustments Continue

Employes of The Standard Oil Company (Ohio) and its subsidiaries, Sohio Petroleum Company and Sohio Pipe Line Company, will continue to receive special additional monthly wage adjustment checks, according to W. T. Holliday, president. These special checks, first authorized for a four months' period in November, will now be continued until further notice. Each month the check will be for 10 percent of the previous month's total wage earned by the employe.

• Arkansas

State Has First Kilpatrick Lime Distillate Production

First Kilpatrick lime distillate production for state established; little wildcat activity reported.

Miller County: The Carter Oil Company's deep pay test in the Fouke field, Philyaw C-159, C SW SE 36-16s-27w, has been completed for the state's first commercial distillate production in the Kilpatrick lime. The test was designed to test the Cotton Valley and went to 7505 feet, where drilling was stopped by salt water. The well was plugged back to 4980 feet and perforated at 4940-44 feet. Treatment with 2000 gallons of acid increased production to 72 barrels of distillate and 1,720,000 cubic feet of gas per day, through ¼-inch choke on tubing. Gas-oil ratio was 24,000/1.

E. A. Gabriel's wildcat Paul Martindale 1, C SW SW 32-14s-28w, 2 miles west of Mandeville, is drilling below 4720 feet. Paluxy was topped, by samples, at 2400 feet, and Glenrose at 3123 feet.

Nevada County: J. B. Downs' Groves Land & Timber Company 1, C SE NE NW 1-14s-21w, deep test in the Irma field, probably will be abandoned. The well went to 3160 feet and tested dry. The Travis Peak was topped at 2873 feet.

• Mississippi

Prospective Field Openers Get No New Encouragement

Two prospective field openers test nothing new; LaGrange field test looks sure of new producing horizon.

Jones County: Gulf Refining Company's L. L. Majors 1, sec ne 29-6n-11w, which had previously encountered shows of oil in the Eutaw-Tuscaloosa zone, is drilling below 9550 feet in the Comanchean section after setting casing to 9004 feet. Cores from 9027-102 feet recovered ashy sand with considerable salt water.

Amite County: Gulf's J. A. Rowland, Trustee A-1, SWc NW 39-4n-2e, prospective pool opener, had no luck on drill-stem tests of the 11,000-foot zone. With packer at 11,366 feet the well had a slight blow with mud recovery. Casing was reperforated at 11,349-53 feet, but the test failed. Test was then made with packer at 11,336 feet and the result was a fair blow. Swabbing recovered only water with no shows. Tests continued.

Marion County: Humble Oil & Refining Company's C. Tullos 1, wildcat in SWc 12-1n-18w, is drilling below 7831 feet with chalk indicated at 7478 feet. No shows have been encountered. In the Baxterville field Humble's R. L. Davis has been successfully completed with an initial flow of 307 barrels of 17.5-gravity oil per day through 3/16-inch tubing choke. Production is from 361 perforations at 8760-820 feet opposite the Massive sand zone.

Jeff Davis County: Gulf's C. E. Lee 1, NWc NW NE 14-9n-19w, has been successfully completed in the rapidly expanding Gwinville gas field. With casing perforated at 8076-110 feet with 204 shots, the well flowed at the rate of 4,693,000 cubic feet of gas and 25.3 barrels of 49.5-gravity condensate a day.

Adams County: Texas-Pacific Coal & Oil Company's O. L. Wilson 2, SWc 8-6n-2w, which has shown good possibilities of securing production from the upper sections of the Wilcox in the La Grange field, continues to have encouragement. Casing was perforated at 4637-41 feet and with packer at 4588 feet the well flowed at the rate of 163,000 cubic feet of gas and 108 barrels of oil per day through ¼-inch tubing choke. Tubing pressure was 1400 pounds. With 3/16-inch tubing choke the well flowed for 5 hours at the rate of 120 barrels of oil and 706,000 cubic feet of gas. Testing continues.

Lincoln County: Humble's Nora Sartin 1, SEc 17-6n-8e, Mallalieu field, was marked for the field's first failure in several months. After encountering potential production in stringers of the Lower Tuscaloosa, several sections were perforated between 10,402-62 feet. Zone was acidized and swabbed but only salt water was recovered with traces of oil. Further tests failed to establish production.

Florida

Humble Oil & Refining Company's Gulf Coast Realty Company 9, C SE¼ 24-48s-29e, in Collier County's Sunniland field, prepared to make tests after running 5½-inch casing to 11,592 feet, but was unable to get testing tool below 9500 feet. Operators are trying to ream out. Potential productive section was acidized and a subsequent drill-stem test at 11,546-92 feet recovered oil and acid water.

Humble's wildcat Lee Cypress Company 3, SE SE 28-47s-29e, in the Sunniland area, is drilling below 10,616 feet. Cores taken at 9950-54 feet recovered slight shows of oil.

Humble's latest Sunniland test, Gulf Coast Realties 5, C SW SW 20-48s-30e, is drilling below 4318 feet. The test is east of the No. 9.

Monroe County: Gulf Refining Company's State of Florida 1, SWc 2-67s-29e, deep wildcat on Pine Key Prospect, is drilling below 15,148 feet in hard tan limestone. The wildcat continues to recover slight shows of oil. Cores taken at 14,685-94 feet developed shows in dolomite.

Alabama

The Carter Oil Company's East Gilbertown field test, E. A. Rentz 2, SW NW NE 4-10n-3w, Choctaw County, is rigging up pump after setting liner to 3281 feet, total depth. The well cut a fault and topped the Eutaw at 3180 feet, and the "D" sand at 3183 feet. Cores from 3203-43 feet recovered intermittent oil sands.

Georgia

Sun Oil Company's wildcat W. J. Barlow 1, Lot 373, 12th Land District, Clinch County, the state's single test, was abandoned at 3847 feet. A drill-stem test at 3370-3460 feet had a slight blow and recovered only muddy water. No shows were reported at any point.

• Michigan

State's Drilling Operations Slowed to Five New Starts

Despite 3 new plays Michigan drilling operations continue to drag with only 5 starts for the week, including 2 exploratory tests.

Osceola County: The Ohio Oil Company continued coring operations at 4900 feet on Steadman 3, C NW NW 29-18n-10w, first deep test in the Reed City field, but abandonment orders were due to be issued at 5000 feet or less. No potential oil or gas pay zones were reported in the Richfield-Sylvania section, objective of the test. Merrill and Putnam's projected 5000-foot wildcat McLaughlin 1, N½ SE NE 18n-7w, is scheduled to spud this month.

Oceana County: The Carter Oil Company's J. Miller 1, 1320-foot north discovery in Stony Lake pool, 11-13n-18w, flowed 90 barrels on a 3-hour test after 48 perforations at 1628-36 feet in Traverse pay. It is the first completion for the area since the pool was opened late in 1946.

• Illinois Basin

Lawrenceville Pool, Illinois, Gets Southwest Extension

Lawrenceville, Illinois, production extended; Effingham County has McClosky find; Henderson County, Kentucky, discovery pumps 300 barrels after shot; Indiana has discovery.

Illinois

Steve Zanites' Mahrenholz 1, SW 19-3n-10w, Lawrence County, is extending Lawrenceville pool production a mile southwest in McClosky lime at 1880-85

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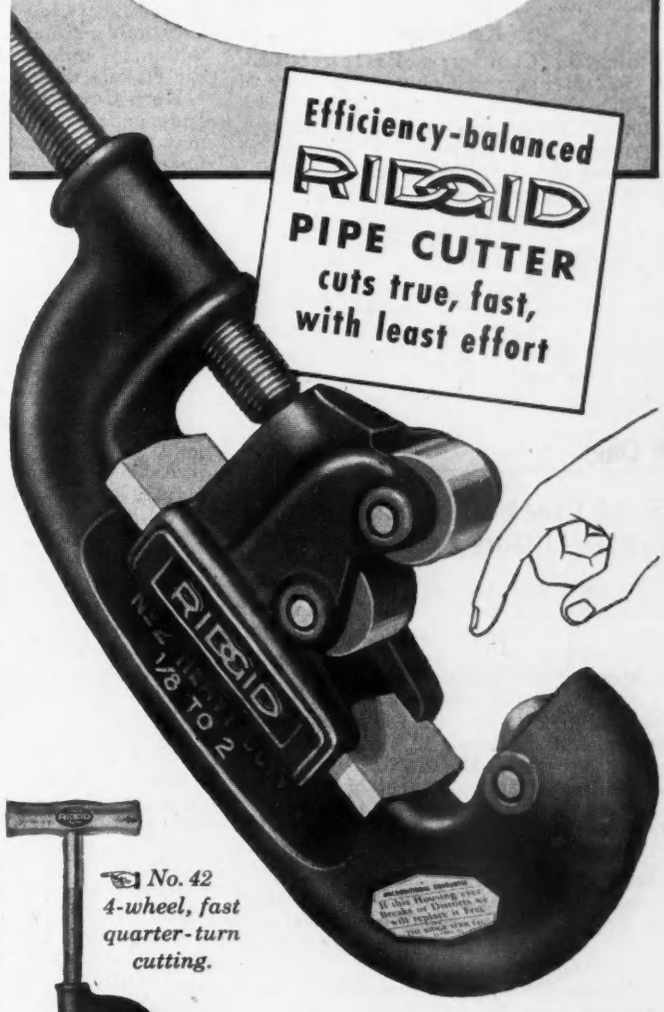

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feet. On initial test the well pumped 190 barrels of oil in 24 hours.

Effingham County: Nu-Enamel Corporation's Adams 1, SW NW SE 10-6n-7e, 3 miles north of Bible Grove pool, pumped 206 barrels of oil in 24 hours from McClosky lime at 2870-78 feet after 1000 gallons of acid. Operators were testing after an additional acid treatment of 5000 gallons.

Wayne County: J. W. Rudy's Hampton 1, SW NE NW 26-1s-5e, a mile northeast of Keensville pool, swabbed 200 barrels of oil in 10 hours from McClosky lime. Pay was encountered at 3155-65 feet. Operator is testing.

Kentucky

Sun Oil Company's Pritchett 13, 21-0-22 Henderson County discovery of the Tar Springs pay in the Dixie pool, pumped 300 barrels in 24 hours after a 30-quart shot. The pay was found at 1885-900 feet. Original production in the pool was from Cypress sand.

Indiana

John Savage's Hall 1, C SE 99-1s-10w, Gibson County, 3 miles north of the North Princeton pool, swabbed 32 barrels of oil in 16 hours from Cypress sand at 1660-70 feet after a 40-quart shot. The well is the first discovery for Indiana in several weeks.

• Ohio

Brush Creek Has Good Gasser; Pittsfield Gets Extension

Brush Creek has big gas well; Pittsfield extended north; mile extension given West Salem; Hemlock Grove has combination well.

Muskingum County: A big gas well was struck at Frazier, in Brush Creek Township, by Ohio Fuel Gas Company. It is R. R. Holskey 1, SW SW 14, ⅓ mile southeast of the discovery well, and gauged 6,600,000 cubic feet of gas. Clinton sand, 3818-72 feet, paid at 3867-72 feet.

Lorain County: Ohio Fuel's Maie E. Burge 1, Lot 117, Pittsfield Township, came in at 1,900,000 cubic feet natural to extend the Pittsfield pool 2000 feet north. The sand lens was 8 feet thick at 2174-82 feet.

Wayne County: A semi-wildcat was completed in the northwest corner of Congress Township that extended the old West Salem pool a mile west. The completion is Ohio Fuel's Mary Jeffrey 1, NW NW 1. It reported 360,000 cubic feet natural and after shot was shut in at 750,000 cubic feet.

Meigs County: The south part of the Hemlock pool is showing more gas with the oil. Preston Oil Company's Arthur C. Willard 2, SE NW 1, came in with a good show of oil and 220,000 cubic feet of gas. After shooting, the well flowed 45 barrels the first day along with 275,000 cubic feet of gas.

• California

Superior's Fresno County Discovery Flows 127 Barrels

Oil discovery in Fresno County flows 127 barrels of 28.4 gravity oil from 12-foot interval; new pay discovery made in button bed horizon in McDonald Anticline field; new fault block Vedder discovery made in Sharktooth Hill area of Round Mountain field; gas field discovery in Humboldt County considered likely; 3 operators awarded 2 state tidelands leases.

Fresno County: The Superior Oil Company has made an oil discovery 3 miles southeast of San Joaquin in 32-15s-17e. Hakala 55 is flowing to tanks at a daily rate of 127 barrels of 28.4-gravity clean oil from perforated interval at 7020-34 feet. Total depth is 7171 feet. The new field becomes one of a half-dozen discoveries made in this part of the county in recent years. It is about midway between the Helm and Raisin City fields. Superior drilled 3 dry holes within 1½ miles before hitting the pay in the Hakala well.

Kern County: Limited areal extent of Independent Exploration Company's new fault block discovery in the Salt Creek field was indicated when a second well, Roco 2, drilled to determine the westerly extent of production, failed to find the oil and was abandoned at 2146 feet. The well is about ¼ mile from the Roco 1 discovery. Standard Oil Company of California's Anderson 81-19w, offset to the Roco lease and about 1 mile north of the discovery, was also dry and quit at 2970 feet.

Honolulu Oil Corporation and Wilshire Oil Company have made a new pay discovery in the McDonald Anticline field. Layman 1, an easterly outpost test in 18-28s-20e, has been completed flowing 200 barrels of 17.8-gravity oil through 24/64-inch choke. Production is from the button bed horizon, topped here at 1150 feet. The well was drilled to 2080 feet and plugged back to 1278 feet.

A new fault block discovery has been made in the Sharktooth Hill area of the Round Mountain field by Morton and Kohlbush, whose Alma 1 in 15-28s-28e has been completed on the pump for 168 barrels of 12-gravity oil, 15 percent cut. Production is from the Vedder, logged at 2715 feet. Total depth is 2746 feet.

Pacific Western Oil Corporation has been unable to free over 16,000 feet of drill pipe fish in its National Royalties 1 deep test in 5-26s-22e although cuts were made at 12,282, 12,317 and 16,315 feet. Operator is now trying to determine at what point the pipe is stuck.

Kings County: Standard's 73-30V discovery on the Middle Dome of Kettleman Hills has been take off production and the company will now go in the hole and recover as much of the drill pipe fish as possible. Top of the fish is at 10,971 feet. Until the pipe is removed it will be impossible to locate the point of water entry in the well. It was making 11 barrels of oil a day just before being taken off production.

Humboldt County: The Texas Company's Anderson 1 near Hydesville in 8-2n-1e may be a gas discovery. The well has been undergoing tests and at last report crew was running tubing. Redrilled depth is 8770 feet. Location is about 10 miles southeast of Texas' Tompkins Hill gas field.

Santa Barbara County: Honolulu and Signal Oil and Gas Company are extending their wildcatting operations in the Goleta area. Location has been staked for a new test on one of two tidelands leases recently acquired from the state. These leases run 1 mile along the shore and 3 miles out into the ocean. About 1900 acres are involved. Macco Corporation is a party to these leases along with Signal and Honolulu.

• Rocky Mountain Area

Superior Releases Data On Herrick Dome, Wyoming, Well

Superior releases data on Herrick Dome discovery, Wyoming; production tries fail in Carbon County test; Washakie County test seeks Embar production; North Cut Bank, Montana, extension attempt is apparent failure in Madison; Rangely field, Colorado, gets east extension.

Wyoming

The Superior Oil Company of California has released data on its recent discovery at Herrick 1, SW NW SE 1-16n-76w, Albany County, Herrick Dome, 15 miles west of Laramie, confirming most of the information previously reported. The Casper formation (Pennsylvanian) was topped at 3498 feet, with best saturation logged between 3625 feet and total depth. The well pumped at the rate of 360 barrels per day of 21.1-gravity oil, and made a total of 2000 barrels in 6½ days. The oil is reported to carry a high percentage of sulphur. Superior's second operation on this structure is drilling below 2300 feet, and topped the Dakota formation at 2105 feet. This well is ¼ mile southwest of the discovery, and is running approximately 100 feet lower on the Dakota sand. Herrick Dome was first drilled in 1928 when Union Oil Company of California drilled a Sundance failure and was plugged at approximately 2200 feet, total depth.

Carbon County: In the Baggs area, along the Wyoming-Colorado state line, Kerr-McGee and Phillips Petroleum Company have been unsuccessful in attempts to find production in the gas horizons encountered when the well was drilled. The test is Unit 1, C SE SE 10-12n-92w, and was drilled to 9512 feet, total depth, in the Mancos shale. Casing was run after the well was plugged back to 4212 feet, and perforations opposite gas sands have shown only water. The best zone was between 3860-80 feet, and when perforated with 39 holes, some water was swabbed. The operators will continue testing up the hole.

Washakie County: At the deep test on the South Fork structure, General Petroleum Corporation was preparing to perforate casing opposite the Embar after failing to find production in the Tensleep and Madison. The well is 88-24-G, SE SE SE 24-46n-92w, and was drilled to 10,900 feet, total depth, before plugging back. On drill-stem test of the lower formations, only mud and muddy water were recovered. Embar was topped at 10,065 feet, and casing set through this formation before drilling deeper.

Colorado

An east extension to the Rangely field is apparent with the testing of Stanolind Oil & Gas Company's Well—J. E. Pegger 1, SW SE NW 31-2n-101w, Rio Blanco County. This well found Weber at 6080 feet and was drilled to 6377 feet, total depth. A drill-stem test of the lower section recovered only water, and the well was plugged back to 6299 feet. Following a shot with 242 quarts of

nitroglycerine between 6160-6284 feet, the well flowed 60 barrels of oil in 24 hours and testing continued. This well is more than a mile east of production in Rangely.

Utah

Increasing interest in eastern Utah, a reflection of oil developments in western Colorado, is reflected in recent land office filings.

Pacific Western Oil Corporation is drilling a test below 9400 feet in Carbon County. Standard Oil Company of California, through its Rocky Mountain subsidiary, The California Company, has made filings on lands in eastern Utah. Land office records at Salt Lake City show more than 50 oil and gas prospecting applications in the last 2 weeks of February, covering 125,000 acres.

Among other interested companies are General Petroleum Corporation, Union Oil Company, British-American Oil Producing Company, Stanolind Oil & Gas Company, Continental Oil Company, The Ohio Oil Company, and Fulton Oil Company (Seattle).

• Canada

Leduc Discovery Makes 8325 Barrels in First 30 Days

Imperial Oil Ltd.'s Leduc 1, discovery in 1st 5 22-50-26w4th, produced a total of 8325 barrels of 39-gravity crude its first full 30 days on production. Excepting the initial 14 hours (when open flow rate was about 950 barrels daily), the well has been restricted to a fraction of its potential through chokes ranging in diameter from 1/16 to 5/16 inch. Producing from a Devonian limestone zone at 5029-66 feet, the well has not been acidized.

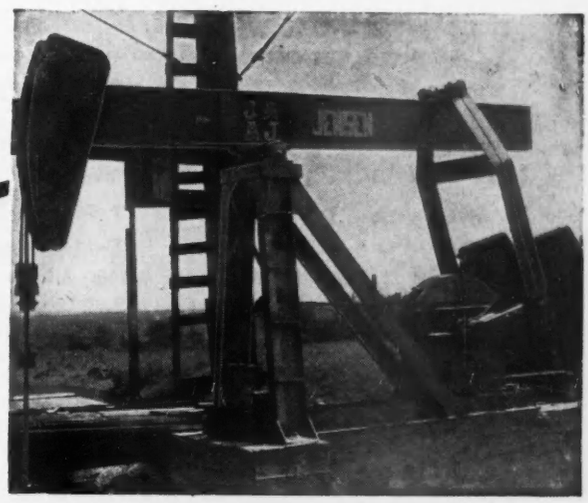
Imperial has followed up its discovery by putting 3 rigs to work. Imperial-Leduc 2, 1st 1 16-50-26w4th, 1¼ miles south and ¾ mile west of the discovery, was spudded February 12, 24 hours before No. 1 was actually placed on production and is now drilling below 4100 feet. Imperial Leduc-3, 1st 10 26-50-26w 4th, 2 miles northeast of the discovery, was spudded March 14. Imperial-Leduc 4, 1st 16 15-50-26w4th, ¾ mile east and ½ mile south of the discovery, is rigging up.

Meanwhile, McColl - Frontenac Oil Company (The Texas Company affiliate) is rechecking seismograph data preliminary to staking 2 wildcats in the general Leduc area. One test is expected to be some miles southeast of the Imperial discovery, the other several miles west. Both sites are expected to start in April.

Independent companies, successful in the scramble for small parcels of 'freehold' rights in the Leduc area, are expected to get drilling operations under way in the near future. Locations staked to date include: Continental-Leduc 1, 1st 9 33-49-26w4th, 3 miles south of the discovery; Globe Oil - Leduc 1, 1st 6 5-50-26w4th, 3 miles southwest of the discovery; and Leduc-West Oils 1, 1st 6 19-50-26w4th, about 2½ miles west of the discovery.

A 72-mile road and a string of bridges through remote, unsettled territory, begun last July, was finally completed this month to link the Muskeg Anticline in Alberta's Northern Foothills with the railway point of Entrance. Heavy-duty rotary equipment is now being moved up the road to site for "Operation Muskeg's" wildcat, costliest single drill venture in Western Canadian history. Site for the well, Northern Foothills Agreement Muskeg 1, has been staked in unsurveyed territory, with approximate legal description the SE corner of 24-57-6w6th. It will be a limestone test, with probable depth around 10,000 feet. Backers of the venture are five majors, Imperial Oil, Shell Oil Company of Canada, McColl-Frontenac Oil Company, Socony-Vacuum Oil Company and Gulf Exploration & Development Company. Cost of the venture, including geological and geophysical work over the past 4 years and road construction, is expected to exceed $1 million.

McColl-Frontenac and Union Oil Company of California have obtained a large natural gas well with open flow potential 26 million cubic feet daily at their joint wildcat, No. 10D-9-4-9, 1st 10 9-4-9w4th, in the South Foremost-Pakowki area of the Southeast Alberta Plains. The wildcat, completed in the Bow Island sand series at 2237 feet, extends the team's big gas reserve and adds a further link between the old Foremost gas field and the Pakowki field, discovered by the team in mid-1946. The team has completed 7 gas wells with potentials ranging up to 48,-058 Mcf along a 16-mile stretch and plan a total of 25 wells by the end of 1947. A synthetic gasoline project is back of the exploration. Reserves proven to date are estimated in excess of 200 billion cubic feet.



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■ Cardwell K. L. Double Drum Rotary Drawworks. GAK 145 Waukesha engine, perfet condtion, can be seen operating at Luling, Texas. P. O. Box 709, Phone 596, Conroe, Texas.

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■ Lumber for Sale: 3x6 and wider 10 to 16 rough oak $58.00. E. J. Gaiennie Lumber, Box 1074, Shreveport, Louisiana.

■ 5 Complete Reda Pumping Units. Cables like new. 75 and 97 H.P. Motors. Max Steinbachel, 1905 Park Place, Wichita 4, Kansas. Phone 5-6082.

■ FOR SALE—1 Allis-Chalmers UM Pulling Unit with mast and tools, mounted on 1941 Ford truck, all in good condition. A. Holpkemeier, 719 E. 13th St., Ada, Okla.

■ Two LeRoi Model RXIV 225 H. P. reconditioned gas-gasoline engines, complete with radiators and power takeoffs. One equipped with engine starter. Will sacrifice in order to make quick sale. Empire Oil Field Machinery Co., Box 4026, Odessa, Texas, Telephone 1480.

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■ I own and offer for sale, all or any part of the following properties. One half or all of one well, producing for 7 years, 40 gravity oil, price $1.70 per bbl. income average $150.00 per month. My interest in one well, income $60.00 per month, small oil payment, when paid out in short time, will be returned to me, will double income. High gravity oil, well seven years old. Sell my interest in 2 wells producing on 35 acres, room for 4 more wells, shallow depth. All equipment pipe, tanks, pumping units included in sale. In good order and no broken down equipment. Address: Box 15, c/o The Oil Weekly, Houston, Texas.

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■ TITLE ATTORNEY—over twelve years experience, desires connection with oil company or individual in Oklahoma. Box 5205, Farley Station, Oklahoma City, Oklahoma.

■ CIVIL ENGINEER, graduated Texas A. & M. College, age 29, seeking sales position of oil field specialty, to headquarter in San Antonio, account wife's health. Four years with major oil company in refinery, design and construction and district field engineer. At present employed as sales engineer industrial insulations. Address: Box 18, c/o The Oil Weekly, Houston, Texas.

SITUATIONS WANTED

■ Petroleum Geologist — Petroleum Engineer and Land Man with seven years' experience desires retainer or interest connection with independent oil operator. References on request. Address: Box 14, c/o The Oil Weekly, Houston, Texas.

■ Seven years experience major company clearing titles producing leases, handling pooling agreements, indemnities, deeds and assignments; for past two years and now supervisor division order section; licensed attorney; middle age. Desire change, preferably independent. Good standing present employer; furnish excellent reason for change. Address: Box 17, c/o The Oil Weekly, Houston, Texas.

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■ WANTED — One Amerada pressure bomb 1¼" O.D. 4000# element complete with clock and accessories. Engineering Service Co., Inc., P.O. Box 3094, Corpus Christi, Texas.

■ Drilling equipment wanted—1500 Failing, 37 Sullivan, F Franks, or other make of similar capacity. Fred Butler, 1013 Cedar, Casper, Wyoming.

■ WANTED TO BUY: 500 feet 2⅜" flush joint drill pipe used or new. Rotary drill rig mounted on truck good for drilling to 3,000 feet. James H. Feese, 1311 East Third St., Casper, Wyoming.

■ WANTED rod and tubing machine mounted on truck with telescopic mast. Must handle 3500 foot wells 2½" tubing. Nabob Oil & Gas Company, Box 448, Amarillo, Texas.

■ Wanted: Power pipe threading machine to thread pipe up to 6 inches in diameter. Give details as to condition of machine and dies to go with machine. Don Roe, Vandalia, Ohio.

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EXPLORATORY FAILURES

ARKANSAS WILDCAT

Union County: Plymouth Oil Co.'s Mrs. Leora Trammell 1, c w½ se se 7-18s-12w, Wilcox 1320, Midway 1700, Nacatoch 2268, Travis Peak 2812, Cotton Valley 3888, Buckner 6120, Smackover 6230, abnd 3-5-47 at 6301.

CALIFORNIA WILDCATS

Kern County: Casner and Bentz's Osmond 1, 3-27s-20e, Belridge area, abnd 3-7-47 at 2592.

Tide Water's Midway-McKittrick 5-32, 32-30s-22e, McKittrick area, abnd 3-10-47 at 5730.

GEORGIA WILDCAT

Clinch County: Sun's W. J. Barlow 1, Lot 373, 12th ld dist, abnd 3-5-47 at 3847.

ILLINOIS WILDCATS

Bond County: Herbert Hoffman's Wilson 3-A, se se ne 24-4n-3w, abnd 2460.

Clark County: Hessler Oil et al's Buckler 1, se se nw 36-12n-14w, abnd 150.

Clinton County: R. R. Benoist et al's Krevs 1, sw se nw 26-2n-3w, abnd 1286.

Coles County: Earnest Zink's Baker 1, ne ne nw 10-12n-9e, abnd 1905.

Marion County: H. J. Schlafly et al's Creed 1, se se sw 25-1n-1e, abnd 2329.

Wabash County: Illinois Mid-Continent's Kutrz 1, nw ne se 25-2s-14w, abnd 2874.

F. R. Stocker's Couch 2, ne se ne 11-1n-13w, abnd 1105.

Francis Beard's Mabus 1, ne ne sw 31-2n-13w, abnd 2875.

White County: N. A. Cummings' Walsh 1, se sw ne 9-5s-10e, abnd 3198.

INDIANA WILDCATS

Greene County: H. L. Lambert's Axton 1, se se se 27-6s-7w, abnd 1044.

Knox County: A. J. Slagter, Jr.'s Yockem 1, 9-2n-10w, abnd 2011.

KANSAS WILDCATS

Barber County: M. Huber et al's Cook 1, w½ sw nw 8-34s-12e, abnd 5459.

H. W. Skinner's Fee 1, ne sw ne 5-32s-11w, abnd 4406.

Ellis County: M. J. Sullivan's Reemsnyder 1, c se se 33-12s-18w, abnd 3760.

Mitchell County: Dalton Wood's Meeham 1, nw nw sw 25-6s-9e, abnd 1753½.

Pawnee County: Berwick Spruill & Harms' Tammen 1, ne ne ne 9-20s-16w, abnd 3817.

Rooks County: B. B. Drlg. Co.'s Roy 1, sw sw ne 14-8s-20w, abnd 3495.

Sumner County: Wakefield & Flynn's Frantz 1, ne ne se 8-31s-3w, abnd 4522.

KENTUCKY WILDCATS

Daviess County: Miller-Shiarella-Ashland O & R Co.'s Robertson 1, 13-N-27, abnd 2428.

Henderson County: John Buchman's Dickey 1, 2-0-22, abnd 2810.

Union County: J. W. Carter et al's Waller 1, 7-0-18, abnd 2600.

SOUTH LOUISIANA WILDCAT

Assumption Parish: Superior's Arthur Schexneyder 1, nwc sw¼ 46-12s-13e, sw flk Napoleonville Dome, abnd 3-11-47 at 7850.

MICHIGAN WILDCATS

Clare County: E. V. Hilliard's Douglass 1, ne sw se 24-20n-3w, Dundee lime 3876, abnd 3-5-47 at 4056.

Kent County: Rex O & G Co.'s Bruursma 1, nw se sw 33-5n-12w, Traverse, abnd 3-7-47 at 1720.

Montcalm County: Cities Service's Nelson 1, nw se sw 3-10n-7w, abnd 3-9-47 at 1375.

Sun's Mills 1, c sw 25-12n-9w, abnd 3-8-47 at 1218.

Osceola County: Ashby Drlg. Co.'s Foster 1, sw ne ne 12-18n-8w, abnd 3-8-47 at 1604.

Ottawa County: Boeve and Gannet's Ocobock 1, ne sw nw 22-5n-13w, Traverse 1760, abnd 3-6-47 at 1768.

NEW MEXICO WILDCAT

Eddy County: Richfield Oil Corp. et al's Lake McMillan Unit 1, c nw se 36-20s-26e, elev 3248, Seven Rivers 460, red sand 1090, San Andres 1690, middle Delaware 1865, Bone Springs 3170, abnd 3-8-47 at 6020.

OHIO WILDCATS

Coshocton County: Pure's C. E. Hawthorne 1, se nw 3, Perry Township, Clinton 3244-88, abnd 3-7-47 at 3416.

Muskingum County: J. L. Hunt et al's Ralph Rehl 1, ne ne 3, Springfield Township, Clinton 3595-3644, abnd 3-6-47 at 3730.

OKLAHOMA WILDCATS

Carter County: Bishop Oil Co.'s McConnell 1, ne ne nw 14-3n-3e, abnd 2095.

Comanche County: G. C. English's Coldren 1, sw nw nw 15-1s-13w, abnd 3120.

Albert Beck's Cramer 1, ne ne ne 10-1n-12w, abnd 840.

Cotton County: Harry Kahn's Rhodes 1, sw sw sw 28-1s-9w, abnd 2507.

E. G. Anderson's Stoner 1, nw ne se 13-2s-13w, abnd 1297.

R. G. Anderson Drlg. Co.'s Stoner 1, nw ne se 13-2s-13w, abnd 853.

Bridwell O & G Co.'s Roberts 1, 8-1s-9w, abnd 3400.

Goza & Webb's Wilson 1, ne ne sw 8-4s-11w, abnd 1660.

Griffin & Barbre's Warren 1, se se sw 28-4s-11w, abnd 2009.

E. P. Griffin's Gibson 1, ne se se 29-4s-10w, abnd 1810.

Houston Brower's Wolfe 1, se se sw 21-3s-11w, abnd 1602.

Kingwood Oil Co.'s Sellers 1, 27-3s-11w, abnd 2510.

Garvin County: M. B. Armer's Bolling 1, se ne nw 27-1n-1w, abnd 3320.

Hughes County: S. D. Butcher et al's Rogers 1, se ne ne 16-8n-11e, abnd 3658.

Terola Drlg. Co.'s Bartlett 1, sw sw se 13-7n-9e, abnd 3110.

Oklahoma County: Ptak Pet.'s McBirney 1, ne ne se 17-14n-1w, abnd 5969.

Pawnee County: Porter O & G Co.'s State 1, se se se 16-23n-4e, abnd 3873.

Payne County: Warren Oil Co.'s Swart 1, se se ne 32-20n-2e, abnd 5139.

Pottawatomie County: T. N. Berry's Andes 1, nw nw se 15-6n-3e, abnd 3020.

Seminole County: Davon Oil Co.'s Reed 1, sw sw ne 33-9n-7e, abnd 3480.

Tillman County: M. A. Freeman's Wells 1, se se ne 9-1s-17w, abnd 2920.

Hartwell Oil Co. et al's Williams 1, se se nw 13-1n-17w, abnd 620.

WEST TEXAS WILDCATS

Dawson County: Ray A. Albaugh et al's Dorsey 1, c sw sw HE&WT Ry. 13, blk 33, T-7-N, anhydrite 1730, Grayburg 3590, abnd 3-14-47 at 4360.

Ward County: Stanolind's Sealy-Smith 17-A, c ne ne G&MMB&A 19, blk A, abnd 3-9-47 at 1120.

Stanolind's Sealy-Smith 18-A, c se se G&MMB&A 18, blk A, abnd 3-12-47 at 1590.

WEST TEXAS NEW PAY TEST

Garza County—Post Field: Geo. & Herman Brown-Comanche Corp.'s Post 11-A, nw se sw T.T. Ry 1236, elev 2535, abnd 3-3-47 at 6010. pb 3002 as pumper in regular pay.

NORTH TEXAS WILDCATS

Archer County: P. C. Burns et al's Abercrombie 1, 150 snl 1050 wel sect 1, Hooper & Wade sur, abnd 2-28-47 at 1119.

Cooke County: Cities Service Oil Co.'s Bezner 1, 330 out sec David Lockett sur, elev 752, Ellenburger 2350, abnd 3-9-47 at 2406.

F. R. Jackson et al's Johns 1, 800 snl 450 ewl Jas. Chaffin sur, Ellenburger 2162, abnd 3-4-47 at 2214.

W. O. Russell et al's Alexander 1, 467 ewl 1650 nsl H. Nail sur, elev 902, Ellenburger 1380, abnd 3-8-47 at 1384.

TEXAS PANHANDLE WILDCAT

King County: Stanolind's Masterson 1, 660 snl, 6606 wel sect 1, E. L. Ribble sur, elev 1806, reef lime 4475, abnd 3-10-47 at 4548.

NORTHEAST TEXAS WILDCAT

Harrison County: C. H. Murphy Jr.'s M. L. Matthews 1, 660 fr n&el 98.1-ac tr and G. Martin sur, 10 mi s Marshall, base Annona 2436, Pettit 6470, Travis Peak 6661, abnd 3-9-47 at 7258.

SOUTH CENTRAL TEXAS WILDCATS

Atascosa County: Humble's Emelia Lujan et al 1, 660 fr s&wl 500-ac lse and John Noble sur 1438, Dobrowolski area, 1⅛ mi ne Charlotte fld, abnd 3-6-47 at 7119.

H. R. Smith et al's Hurt & Tartt 6, 467 fr swl 2333 fr sel 1476-ac lse and Jas. Wilkinson sur 144, 6500 sw Weigang fld, abnd 2-24-47 at 3796.

Caldwell County: C. H. Robertson's W. B. Walker et al 1, 330 fr s&wl 176-ac lse, Robt. Davidson sur, Navarro 2052, Taylor 2388, Buda 3383, abnd 2-27-47 at 3588.

McMullen County: O. D. Edwards Jr.'s Annie Graves Delph et al 4, 1170 fr el 703 fr nl sect 36, Shumway sbdn Shiner Rch, Francisco Gomez sur 48, abnd 3-1-47 at 1505.

Zavala County: Texas Co.'s W. L. Hardaway 1, 2200 fr wl 2300 fr nl sect 67, c lot 29,

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Cross S. Rch sbdn, Narciso Aguirre Gr, abnd 3-6-47 at 3925.

SOUTHWEST TEXAS-LOWER COAST WILDCATS

Cameron County: Magnolia-J. S. Abercrombie Co.'s Melvin Giese 1, 1320 fr n&wl blk 13, Burton sbdn 3, Ojo de Agua Gr, 1360.1-ac lse, 4 mi w Sebastian, abnd 3-7-47 at 10,218.

Webb County: Texas Co.'s R. E. Welhausen 1, 330 fr el 2310 fr nl CCSD&RGNG W. W. Griffin sur 28, 640-ac lse, 6 mi nw Lopez fld, abnd 3-7-47 at 2460.

Zapata County: Wm. H. Spice Jr.'s Albert Martin, Tr. 1-A, 330 fr ne&nwl blk 24, Fansler-O'Hern sbdn, Carta Blanca Rch, Villa Gr, 160-ac lse, 2½ mi se Comitas fld, abnd 3-1-47 at 2358.

SOUTHWEST TEXAS-LOWER COAST OUTPOST

Starr County—Reforma: Sun's Matias Pena et al 1, 467 fr wly/wl & sly/nl 295.23-ac lse, Sta. Cruz Gr, 4000 nw gas-dist well prod, abnd 3-2-47 at 7526.

MIDDLE TEXAS COAST WILDCATS

Bee County: Herb E. Dirks-Phillip D. Gully's J. O. Harris 1, 990 fr ne&sel combined lots 11, 12 & 13 in J. H. Harris sbdn, 5000 fr nwl 6500 fr swl Henry Coley sur, 289.45-ac lse, abnd 3-3-47 at 4260.

Karnes County: W. Earl Rowe et al's W. S. Cochran et al 1, 330 fr ne&nwl M. B. Morrison sur, 677-ac lse, 3 mi ne Gillette, abnd 2-28-47 at 4039.

Wilson County: Mid-Continent Pet Corp.-W. C. McBride's W. F. Gabrysch 1, 2438 fr nely/nel 660 fr sel/sel 169.98-ac lse, Louis Manchaca Gr, 3 mi w nw Falls City fld, Sparta 1267, Wilcox 2585, abnd 3-2-47 at 6515.

C. Andrade's Tahddeus Kopecki 1, 2000 fr nwl 447 fr swl 85.5-ac lse and A. Barrera sur 14, 1½ mi n Poth fld, Midway 3656, Navarro 4333, abnd 3-4-47 at 6356 in Edwards li.

UPPER TEXAS COAST WILDCAT

Ft. Bend County: S. A. Brewster-W. O. Bartle's Perry V. Cook 1, 1459.5 fr wl 660 fr sl 738-ac lse and Alex. Phillips sur, 4 mi s Katy gas prod, se side Fulshear Prospect, abnd 3-8-47 at 8012.

UPPER TEXAS COAST OUTPOST

Wharton County: Sparta Oil Co.'s Taylor D. Kemp, Sr. et al 1, 422 fr nwl 200 fr nel 25-ac lse, S. F. Austin 3 1/6-Lge Gr, ½ mi s Boling Dome prod, abnd 3-8-47 at 6240.

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Book Review

As Others See Us

"Those Who Know You Well—Think Well of You," the full report of the exhaustive survey of what the public thinks about the oil industry, is now available for general distribution, the Public Relations Operating Committee announced.

The survey, upon which the current oil-industry public relations program primarily is based, reveals that in many respects large parts of the public do not understand how the oil industry functions, and consequently have unfavorable opinions about it. As many as one-seventh—more than 12 million adults—favor government ownership of the oil industry.

The survey reflects interviews with about 10,000 adults, one of the most comprehensive nation-wide opinion surveys ever made for any industry. The answers reveal both the attitude of the public on important phases of the industry, and the knowledge of the public on facts about the industry.

Results of the survey are broken down into 18 categories so that public opinion and knowledge on each question may be determined, not only by sections of the country, but also by producing and refining areas, sex, age groups, race, urban or rural, type of employment, income level, union membership, politics, car owners, oil-industry employes, and influence groups.

The published volume, 272 pages, is divided into three sections: (1) A brief discussion of the most important findings; (2) a summary and analysis of all the results; and (3) the complete, tabulated returns from all of the questions.

Copies available from The API, 50 West 50th Street, New York, 20. Price, $4.

Arc Welding

Air Reduction has announced publication of "Manual of Design for Arc Welded Steel Structures," a 300-page definitive work which is said to be the first of its kind. Compiled by LeMotte Grover, American Society of Civil Engineers, this book offers useful, up-to-date information covering fundamentals of design, materials, inspection, estimating and engineering control of welding and related operations. Chapters are included to encompass electrode requirements, specifications for welded connections for all sizes of rolled beams, and a series of diagrams for the rapid design of welded connections.

Available for $2 from Air Reduction Sales Company, Department MD, 60 East 42nd Street, New York 17, N. Y.

Louisiana Geological Study

Louisiana Geological Survey Pamphlet No. Four, "Sub-Surface Study of the Delhi Area, Franklin and Richland Parishes, Louisiana," by P. A. Bloomer, Jr., is now available. It contains a discussion of the stratigraphy, producing zones, structure, and geological history of the Delhi, West Delhi and Big Creek oil fields. It consists of 47 pages, two plats, 21 figures and five tables.

Price 75 cents. Louisiana Geological Survey, Geology Bldg., LSU, University Station, Baton Rouge, La.

SQUEAKS from the BULL WHEEL

And Torn, Too

"I don't care what you say, money isn't everything. You can't buy friendship with money!"

"No."

"You can't buy health with money."

"No."

"You can't buy loyalty with money."

"No."

"You can't buy love with money. Am I right?"

"You certainly are right. But you must be speaking of Confederate money!"

Short Cut

"Every time I kiss you it makes me a better man."

"Well, don't try to get to heaven in one night!"

And That's That

A couple of hoboes found a fifth of whiskey along the railroad tracks, and pretty soon the liquor was low and they were high.

"You know, Bill," said one, "tomorrow I'm going to buy this railroad. I'm going to buy all the railroads, all the automobiles, all the airplanes and even all the horses. Then I'm going to ride and everybody else is going to walk."

"Aw, now, you know dog-gone well you're not going to buy all that stuff."

"Why ain't I?"

"Because you know I wouldn't sell 'em."

Song of Open Road

"It's nice to kiss in a quiet, moonlit parking place in the woods, but my boy friend doesn't stop there."

"You mean . . ."

"Yes, he keeps right on driving."

When Ladies Meet

"Is he a nice boy?"

"Definitely not. I'm sure you'll like him."

Vital Statistic

"Just think, children," said the teacher, "A single dolphin will have 2000 baby dolphins."

"Gosh! And how many do the married ones have?"

The Woman's Way

A man when he's happy will celebrate,
A dog will go chasing a cat,
A rooster will crow and a whale will blow,
But a woman will buy a hat.

A man in his sorrow will turn to drink,
A tire when punctured goes flat,
A preacher will pray and a horse will neigh,
But a woman will buy a hat.

A man when he's idle finds mischief to do,
A child turns into a brat,
An owl's a galoot who don't give a hoot,
But a woman exchanges the hat.

Girl to Girl

"My worst sin is vanity. I spend hours every day admiring my beauty."

"That's not vanity — that's imagination."

Furs Take You Far

An unsigned contributor sends from New York a story that could be condensed about like this:

A fellow walked into a fur emporium with a gorgeous blonde on his arm and demanded something expensive to hang on the gorgeous creature.

They yanked out something for about $500 and he rejected it with a snarl. "What alley cat did that come from? Bring me something nice."

Next came a $5000 number, then a $10,000, but with each offering his demands grew louder for something better, much better.

So finally they dug up the key to the vault and brought forth a coat worth about $2 less than the whole East Texas field.

"Now that's fine," said the guy, as his companion stared goggle-eyed at the creation. "Here's my check. You investigate at my bank to make sure it is good, and I will be back Monday for the coat."

But Monday when he returned, he found the store manager in a purple passion. "You fraud! You cheat! The bank never heard of you! If you want that coat you'll have to pay for it in cold cash."

"Oh, but I didn't come after the coat," said our hero. "I came to thank you for a wonderful weekend."

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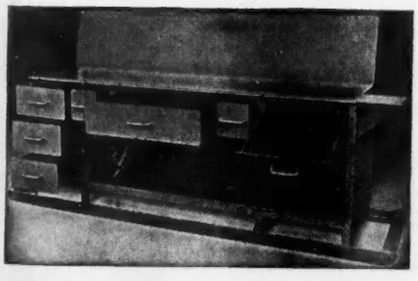

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MEN IN THE INDUSTRY NEWS

Joseph N. Pew, Jr., executive vice president, and **Robert G. Dunlop,** comptroller, were elected chairman of the board and president of Sun Oil Company, respectively, March 18. **Clarence H. Thayer,** chief engineer, was elected a vice president, and **Donald P. Jones,** assistant comptroller, was elected comptroller. Five new members were elected to the Board of Directors. They were **Frank R. Markley,** general sales manager; **Dr. John R. Bates,** assistant to the vice president in charge of manufacturing, and **Donald P. Jones,** all of Swarthmore, Pa.; **William D. Mason,** of Philadelphia, director of industrial relations, and **R. W. Pack,** of Beaumont, Texas, general manager of the Gulf Coast division.

Donald P. Jones

Joseph N. Pew, Jr., a resident of Ardmore, Penn., who has been vice president and a member of the board of directors since 1912, assumes the newly-created office of chairman of the board. Dunlop, of Drexel Hill, Penn., succeeds **J. Howard Pew,** president of Sun Oil Company since 1912, who is retiring. However, he will continue to serve as a member of the Board of Directors.

»

Eugene L. Ames has been named president of Gilcrease Oil Company, San Antonio. Ames, formerly executive vice president, succeeds **Thomas Gilcrease,** who was named chairman of the board. Other officers named were **Lester Whipple,** vice president; **Thomas Gilcrease, Jr.,** secretary; **Barton Gilcrease,** treasurer; **Evelyn Britain,** assistant secretary, and **C. A. Selt,** auditor.

»

Jake L. Hamon, Dallas, Texas, partner in the firm of Cox & Hamon, spoke on "If St. Patrick Had Been an Oil Man" at a recent meeting of the Oil & Gas Division, Oklahoma City Chamber of Commerce. He is a former Ardmore, Okla., resident.

»

T. D. (Dick) Sedberry has resigned as secretary - treasurer and general sales manager of Pelican Well Tool & Supply Company, Shreveport. He joined PELCO almost 36 years ago when the company was located in Oil City, La., and the old Caddo field was in its heyday. He became a stockholder the same year and soon was an important factor in the business. Sedberry has arranged for a gradual acquisition of his company assets by employes. He will continue to reside at 501 Pierre Mont Road in Shreveport.

T. D. Sedberry

Stanley Owens, former safety engineer for Tennessee Gas and Transmission Company, has been named manager of the insurance department in the Houston office, and **Anthony Zuma,** the firm's chief pilot, was made manager of the aviation department. **B. J. Whitley** has been promoted to safety engineer, succeeding Owens.

»

Earl Henderson, landman at Salt Lake City for The Carter Oil Company, has resigned and will do independent lease work from Salt Lake headquarters.

»

Clarence Morley has been transferred from Texas to Casper, Wyo., as scout for the Standard Oil Company (Indiana) crude purchasing department.

»

Harold B. Fell, Ardmore, Okla., executive vice president of the IPAA, addressed members of the YWCA Foreign Policy Association in Oklahoma City on the petroleum industry in the U. S. and abroad.

»

C. H. Dresbach of Western Gulf Oil Company, Los Angeles, leaves this month for Colombia to assume the duties of assistant manager of Colombian Gulf Oil Company.

»

John B. Wooley, geologist of the Shell group and lately from Venezuela, is studying various Shell operations in California. He will leave for Trinidad following the annual meeting in Los Angeles of the AAPG.

»

Olaf P. Jenkins has been made California state mineralogist succeeding **Walter W. Bradley,** retired. Jenkins was formerly state geologist.

»

Dr. Theodore W. Evans has been named manager of the Emeryville research laboratories of Shell Development Company succeeding **Walter J. Hund,** who died February 17.

»

Ken W. Davis, president of Mid-Continent Supply Company, has been made a director of The First National Bank of Fort Worth.

»

Niels C. Georgesen has resigned as district geologist for Tide Water Associated Oil Company to enter the independent consulting field. He will make headquarters in the Hulman Building, Evansville, Ind.

»

F. D. Thomas, veteran of 18 years with General Petroleum Corporation and a member of the comptroller's staff, has been named special assistant to the comptroller of Socony-Vacuum Oil Company of Venezuela at Caracas. Thomas left March 17 to assume his new position.

»

Henry Rowold has been named assistant general sales manager of Mack-International Motor Truck Corporation. Rowold, also a vice president of the company, combines his new duties with those of national accounts manager, a position he has held for some time.

Dr. Ionel I. Gardescu of Houston has resigned from The Texas Company where he was senior geologist and petroleum engineer assigned to special problems in the office of production manager. Though his assignments were varied, his main work concerned studies of field development and valuation of producing properties. Prior in joining Texas in 1940, Dr. Gardescu spent considerable time in foreign work in both Europe and South America. He plans to return to South America in the near future. His temporary office will be at 6818 Kernel Street, Houston.

Dr. I. I. Gardescu

»

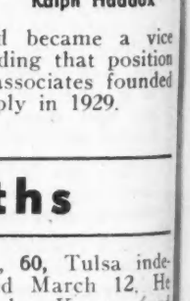
D. U. Skinner, Houston Oil Field Material Company's South American representative, has returned to the U. S. He will remain for approximately six weeks and will then return to his headquarters in Caracas, Venezuela. Skinner has been aiding in sales work and serving as consultant for cutting and fishing tool problems in Central and South America for the past six months.

»

D. L. (Dave) Key and **W. T. (Bill) Moran, Jr.,** have organized Key-Ran, Inc., an oil well service and supply store. The company handles mud products, chemicals, cement and lumber. Stores have been established at Crockett and Huntsville, Texas.

»

Ralph Haddox, Charleston, W. Va., has been named assistant manager of the tubular department of Oil Well Supply Company, U. S. Steel subsidiary. Haddox has been president and general manager of the United Pipe and Supply Corporation of Charleston. He began his career in 1917 in the accounting department of Barium Reduction Corporation. In 1922 he joined McJunkin Supply Company and became a vice president in 1927, holding that position until he and several associates founded United Pipe and Supply in 1929.



Ralph Haddox

Deaths

Perry W. Ward, Sr., 60, Tulsa independent operator, died March 12. He was a native of Topeka, Kansas, and moved to Tulsa in 1917.

»

L. Fisher White, 51, Columbus, Ohio, died March 15. He had been associated with the oil and gas business in Ohio for 25 years.

National Tube Sales Representatives Meet

Sales representatives of National Tube Company, U. S. Steel Corporation subsidiary, met recently at Dallas. Top row, left to right: E. J. Lacombe, New Orleans; L. P. Prigg, Tulsa; Robert Young, Dallas; W. C. Moser, Dallas; P. F. Houserman, Shreveport; C. C. Randall, Houston; J. H. Degnan, Oklahoma City; Jake Easton, Jr., Wichita, Kansas; E. H. Pelster, Tulsa; Jack B. Felton, Midland, Texas.

Middle row: Arthur Elbert, Tulsa; S. H. Reynolds, Houston; T. D. Brissman, Amarillo; G. J. Finlayson, Shreveport; P. G. Chambers, Dallas; A. L. Munn, Fort Worth; C. J. White, Houston; T. W. Thorne, New Orleans; J. H. Morrison, Denver.

Bottom row: J. R. Boax, Houston; D. F. Pate, Denver; G. T. Newman, San Antonio; G. F. Coons, Tulsa; R. W. Wire, southwest district manager of sales, Dallas; J. E. Goble, president, Pittsburgh; W. F. McConnor, vice president in charge of sales, Pittsburgh; F. A. Marsh, Pittsburgh; E. E. Smith, Houston; H. E. Holmes, Dallas.

Longest String of Casing Ever Run Is in Lost Hills Deep Test

Another world's record has been broken at Pacific Western Oil Corporation's National Royalties 1 near Lost Hills, Calif., which until recently was the world's deepest. This well now contains the longest string of casing ever run—a total of 16,406 feet.

Discounting time lost for abnormal delays, the casing was run and set in 16 hours and 5 minutes. There were 412 lengths of 5½-inch casing run in an average of 25.6 lengths per hour.

The casing was run in 132-pound mud and the weight indicator showed 115 tons as the hanging weight of the whole string. Diameter of the hole is 8⅜ inches, which is the largest diameter hole ever drilled below 13,000 feet.

The Superior Oil Company's test near Fort Cobb, Okla., contains 16,351 feet of seven-inch casing, the longest string of that diameter ever set.

Running of the world's record length casing into Pacific Western's well was attended by Cotton Holden and Jack Buchanan, Loffland Brothers' drilling superintendent and head tool pusher, respectively; Warren Craddock and William Green, Pacific Western's acting general superintendent and petroleum engineer, respectively; and two representatives of The National Supply Company, "Tel" Moore, service man, Oil Field Machinery & Equipment Division, and Jim Kennedy, field engineer, Spang-Chalfant Division.

Time-Saving Fishing Job Made With Edwards Reversing Tool

An inexpensive and time-saving fishing job on an 11,000-foot test in Waynesboro County, Mississippi, has been successfully completed by Houston Engineers, Inc., using the Edwards reversing tool.

With drill pipe pulled in two approximately 200 feet below the derrick floor, the firm went in the hole with the reversing tool and on the first trip made a backoff of 9630 feet of drill pipe, leaving two joints sticking up inside the 9⅝-inch casing (set to approximately 10,000 feet).

On the second trip six joints were recovered, clearing the hole down below the casing seat by four joints. As the remaining hole and drill pipe were lost due to a cave-in at a point below the casing, the operator had room enough to sidetrack in the open hole and drill ahead to projected total depth.

Baird Supply Named Distributor For Hinderliter Tool Company

The Hinderliter Tool Company of Tulsa, division of H. K. Porter Company, Inc., of Pittsburgh, has announced the appointment of Baird Supply Company of New York City as its export distributor for well head equipment, blowout preventers, rotary tool joints and related products. John H. Baird and Jack W. Askins are president and assistant manager, respectively, of Baird Supply Company. They maintain offices at 420 Lexington Avenue, New York 17.

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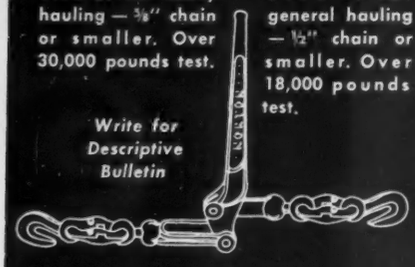

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BE SURE
TO CHECK
THE
Trading Post
Section
ON PAGE 70 OF
THIS ISSUE

Neilsen Pump Founder Retires; R. K. Baker Appointed Manager

Retirement of Karl P. Neilsen, founder of Neilsen Pump Company at Long Beach, Calif., and promotion of R. K. Baker to manager of the organization have been announced.

Neilsen started the company as a repair shop in 1924. It became the Neilsen Pump Division of Oil Well Supply Company, subsidiary of U. S. Steel Corporation, on August 1, 1945. Neilsen remained with the organization as division manager until his retirement. Baker has been associated with Neilsen in various capacities almost from the beginning of the Neilsen Pump Company in 1924.

E. E. Stevenson, chief engineer, and S. P. Glasgow, sales manager, continue in these capacities, Glasgow with added responsibilities in the supervision of stores.

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